

3 1761 11850100 6

CAZON  
Z1  
-83 H021



89

MIRKIN

ROYAL COMMISSION OF INQUIRY INTO CERTAIN  
DEATHS AT THE HOSPITAL FOR SICK CHILDREN AND  
RELATED MATTERS.

Hearing held  
8th floor  
180 Dundas Street West  
Toronto, Ontario

X The Intique

The Honourable Mr. Justice S.G.M. Grange  
P.S.A. Lamek, Q.C.  
E.A. Cronk  
Thomas Millar

Knazam

Commissioner

Shanichoff

Counsel

Associate Counsel

Chish

Administrator

Labaw

Transcript of evidence  
for

12 January 1984

Shawahan

VOLUME 89

Re-exam Pt 11

OFFICIAL COURT REPORTERS

Angus, Stonehouse & Co. Ltd.,  
14 Carlton Street, 7th Floor,  
Toronto, Ontario M5B 1J2

595-1065



Digitized by the Internet Archive  
in 2023 with funding from  
University of Toronto

<https://archive.org/details/31761118501006>





ROYAL COMMISSION OF INQUIRY INTO CERTAIN  
DEATHS AT THE HOSPITAL FOR SICK CHILDREN  
AND RELATED MATTERS.

Hearing held on the 8th Floor,  
180 Dundas Street West, Toronto,  
Ontario, on Thursday, the 12th  
day of January, 1984.

- - - -

THE HONOURABLE MR. JUSTICE S.G.M. GRANGE - Commissioner  
THOMAS MILLAR - Administrator  
MURRAY R. ELLIOT - Registrar

- - - -

APPEARANCES:

P.S.A. LAMEK, Q.C. ) Commission Counsel  
L. CECCHETTO )  
Counsel for the Attorney  
General and Solicitor General  
of Ontario (Crown Attorneys  
and Coroner's Office)  
I.J. ROLAND )  
M. THOMSON )  
R. BATTY )  
Counsel for The Hospital  
for Sick Children  
D. YOUNG )  
Counsel for The Metropolitan  
Toronto Police  
K. CHOWN )  
Counsel for numerous Doctors  
at The Hospital for Sick  
Children  
E. McINTYRE )  
Counsel for the Registered  
Nurses' Association of Ontario  
and 35 Registered Nurses at  
The Hospital for Sick Children

(Cont'd)







APPEARANCES (Cont'd):

D. BROWN Counsel for Susan Nelles -  
Nurse

E. FORSTER Counsel for Phyllis Trayner -  
Nurse

J.A. OLAH Counsel for Janet Brownless -  
R.N.A.

B. KNAZAN Counsel for Mrs. M. Christie -  
R.N.A.

S. LABOW Counsel for Mr. & Mrs. Gosselin,  
Mr. & Mrs. Gionas, Mr. & Mrs.  
Inwood, Mr. & Mrs. Turner, Mr.  
Mrs. Lutes, and Mr. & Mrs.  
Murphy (parents of deceased  
children)

F.J. SHANAHAN Counsel for Mr. & Mrs. Dominic  
Lombardo (parents of deceased  
child Stephanie Lombardo); and  
Heather Dawson (mother of  
deceased child Amber Dawson)

W.W. TOBIAS Counsel for Mr. & Mrs. Hines  
(parents of deceased child  
Jordan Hines)

J. SHINEHOFT Counsel for Lorie Pacsai and  
Kevin Garnet (parents of  
deceased child Kevin Pacsai).





INDEX of WITNESSES

	<u>Page</u>
<u>MIRKIN, Dr. Bernard L. (Resumed)</u>	1
Cross-Examination by Ms. McIntyre	1
Cross-Examination by Mr. Knazan	32
Cross-Examination by Mr. Shinehoft	51
Cross-Examination by Mr. Olah	70
Cross-Examination by Mr. Labow	103
Cross-Examination by Mr. Shanahan	144
Re-Direct Examination by Mr. Lamek	164

LIST of EXHIBITS

<u>Exhibit No.</u>	<u>Description</u>	<u>Page</u>
317	Article entitled: "Kinetics of Digoxin Absorption and Relation of Serum Levels to Cardiac Arrhythmias in Children."	103
318	Article entitled, "Relation Between Plasma and Red-cell Electrolyte Concentrations and Digoxin Levels in Children".	127







DP.jc  
A

1

2

--- On commencing at 9:30 a.m.

3

4

5

6

7

8

9

10

11

12

13

14

15

(2)

16

17

18

19

20

21

22

23

24

25

THE COMMISSIONER: There was an index to Dr. Moller's report which has been given to us by Miss Fineberg. I guess we will put that with Exhibit 314. There is also an index to Mr. Cimbura's report. Did you do this too, Miss Fineberg? Are you responsible for this one as well?

MS. FEINBERG: Yes, I am.

THE COMMISSIONER: How do we know whether it is 95 A, B or C? Have you numbered all the pages or what has happened?

MS. FEINBERG: What has happened is that the reference to each report is indicated by the child's name.

THE COMMISSIONER: I see there is 95A, B, C, all right, that is fine. That will go with Exhibit 95, then.

Yes, Miss McIntyre?

MS. McINTYRE: Thank you, Mr. Commissioner.

DR. BERNARD L. MIRKIN, Resumed

CROSS-EXAMINATION BY MS. McINTYRE:

Q Dr. Mirkin, I would like to ask you some questions about the Inwood baby.

A I beg your pardon?







A.2

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Q Inwood - I believe it is  
No. 32. As I understood your evidence, you thought  
that this death was attributable to either high  
potassium levels or to digoxin intoxication?

A I think probably the latter more  
likely in view of the data that was accumulated. As  
far as the potassium was concerned, we had on March 13  
obtained from the chart data indicating that this  
patient had a serum potassium of 7.3. As far as I  
understand, there was no mention whether this was  
a hemolyzed or non-hemolyzed blood specimen. In the  
event it was a hemolyzed specimen that concentration  
might have been spuriously elevated. The only  
reason the potassium comes in is that with 7.3 one  
might have seen the symptoms that were presented on  
March 13 in this patient where the heart rate slowed.  
A high serum potassium is associated or can correlate  
with that.

Q I take it that the reason that -  
going to the digoxin for a moment - the data that you  
referred to is the post mortem digoxin level?

A That is correct. I think that  
conclusion was based on those findings to a large  
extent.

Q And as I understand it your





A.3

1

2

team rating this child as zero did not find any  
clinical indicators of digoxin intoxication?

3

4

5

6

7

8

9

10

11

A. That is correct. I am  
getting at your question now. We gave Kristin Inwood  
a rating of zero based on the scoring here which was  
based primarily on the data available in the chart  
in that we had no evidence of a digitalis-induced  
arrhythmia and the blood level in this patient we  
felt was certainly consistent with a non-toxic  
therapeutic level, that is the blood level on March  
12th, which was 2.6. Correct?

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. Yes, that is the ante mortem  
level.

A. Exactly.

14

15

16

17

18

19

20

21

22

23

24

25

Q. I take it in going through  
the final events as indicated in the chart  
there was nothing in that to lead you to believe that  
there was digoxin intoxication?

18

19

20

21

22

23

24

25

A. No, we could find nothing to  
explain the findings in this patient. Of course I  
will remind you that on March 11 the patient was in  
no apparent distress and was tolerating feedings very  
well. As you know, that is an excellent sign of an  
infant doing reasonably well. On March 12, one day  
later, the patient began to present signs of







A.4

1

2

congestive failure, and on March 13 the baby expired.

3

4

5

6

7

Now, if one wants to make a scenario out of this, one could say that the events that were described on March 12 were attributable to some effect on the function and performance of the heart that could have been induced by a drug or by some exogenous material.

8

Q. Would that include digoxin?

9

10

11

12

13

14

15

16

A. It would include digoxin I think, that is an excess of it. This patient presented here in the chart on March 12 signs of congestive failure. The one thing that would probably mitigate a little bit against the digoxin theory on March 12th - I have in my notes the fact that the patient's heart rate increased. If the patient had really received a very large dose of digoxin I would have anticipated a decrease in the heart rate. Okay?

17

18

19

Q. Is there some other explanation that you have other than the possibility of digoxin intoxication that would explain that scenario?

20

21

22

23

24

25

A. Again, going back to the other potential factor that constitutes real data in this patient, the serum potassium being elevated - well, the serum potassium on March 12 was 5. That is normally not going to produce any of these symptoms and







A.5

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

I don't know how else to explain that other than a change in the status of the condition of this patient and one would say, well, it was secondary to the basic disease of the patient, without knowing if any other exogenous agent might have been presented to this child.

Q In any event I take it that your real concern with respect to the digoxin intoxication comes from the post mortem levels that were reported?

A I think that is a correct conclusion on your part.

Q I would like to have you look at those for a moment. They are in Exhibit 95, if you have a copy of that exhibit. Before you do that, I would just remind you that within 24 hours of this child's death she had received administration of digoxin. She had been prescribed a dose of .006 milligrams and in error she had received another baby's dose of .02 milligrams. That was within 24 hours of her death. The post mortem results, page 7 of 95A, showed certain concentrations in the tissues.

A If you can hold a moment, I do not have - I have it here, thank you.

Q I take it, Doctor, given the





A.6

1

2

3

4

fact that she had received digoxin shortly before  
her death that the tissue levels : found there  
are not surprising?

5

6

7

A. Well, the tissue levels - I  
think rather than say the tissue levels we should  
probably say, I would, that the presence of digoxin  
is not surprising.

8

9

Q. In the tissues?

10

11

12

A. Yes.

Q. I take it that you feel that  
the actual level as opposed to the existence of  
digoxin in tissues is hard to interpret?

13

14

A. I think under these circum-  
stances it is, yes.

15

16

Q. So those levels then are not  
the real concern? It is a level 491 that was found,  
reported in Exhibit 95C, that is the real problem?

17

18

19

20

21

22

23

24

25

-







1

2

B  
DM/PS

3

Q. Doctor, have you been advised  
as to the history of that particular sample?

4

A. Yes. My understanding was --  
or perhaps you want to refresh my memory on it.

5

6

7

8

9

10

11

12

13

14

Q. Okay. As I understand it  
this sample was taken for another purpose and it was  
in the Virology Lab and had been in a vial in the  
refrigerator in the Virology Lab for approximately  
ten months. In fact, the history of the vial appears  
to be relatively obscure and it is not clear whether  
or not the vial was stoppered the entire time; it is  
not clear whether it was frozen, heated, or what  
conditions it went through. My question to you is  
whether in your opinion that history might affect the  
reliability of the measurement?

15

16

17

18

19

20

21

22

23

24

25

A. Well, certainly freezing  
will not, in my department we freeze samples all the  
time. Heating, to the extent that the sample is  
allowed to reach room temperature, certainly does not  
seem to be injurious or destroy the digoxin.  
Boiling, on the other hand, for a projected period  
might. But then I think the serum sample would have  
obviously different characteristics that might have  
been recognized by the lab; that is, you might look  
at the inscription whether or not a protein had







1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
been precipitated in the serum sample. That would give you some sense of whether anything had occurred to the sample to allow, how shall I say, a very strenuous modification in its environment. I am talking more about heat, heat labile material.

Q. What about the possibility of evaporation?

A. No.

Q. If we have this liquid substance sitting and it is not completely stoppered if it has something over the top.

A. It was not frozen, I understand, it was in the refrigerator, correct?

Q. Yes.

A. At about 4 degrees centigrade, roughly.

Q. That is not entirely clear, but that would seem to be most reasonable.

A. All right, if it was refrigerated for a long time it really doesn't evaporate too much and you can leave the stopper off. Now, I think in all honesty -- one of the reasons I don't think evaporation would occur here to a great extent, though some might have occurred certainly, is that the humidity in the refrigerator is probably





1  
2 such a level that perhaps not too much evaporation  
3 will occur in that environment.

4 Q. Is there something unusual  
5 about refrigerators in the laboratory that would  
6 result in that? I know certainly things evaporate in  
7 my refrigerator when I leave them sit.

8 A. Well, we do have an expert  
9 here on culinary arts that we can bring into this  
10 if we need. Depending on the refrigerator; as a  
11 matter of fact, some of the units that are in  
12 laboratories do have humidity control, and I presume  
13 this is so. In a virology laboratory, however, it  
14 might have been in a temperature controlled environ-  
15 ment and I think it might be simple to inquire  
16 if it were an ordinary refrigerator and so be it.  
17 I think one would have to say, yes, the possibility  
18 does exist that some evaporation might have occurred.  
19 I think it is low likelihood and if evaporation oc-  
20 curred this is possible that it might have increased  
21 the relative concentration that was perceived by  
22 assay.

23 Q. You say possibly, would it  
24 not be in fact the case that if the volume were  
25 reduced by 50% that the concentration would double?

A. That's a fact, that's correct,







1

2

yes.

3

4

Q. So in fact evaporation would indeed lead to an increase in the level.

5

6

A. Yes, I was just talking about the possibility of evaporation.

7

8

THE COMMISSIONER: The digoxin will not evaporate, is that right?

9

10

11

12

THE WITNESS: The digoxin would not evaporate. I think the evaporation will not lead to an increase in the level, because, we should be precise here. Evaporation will lead to an increase in the concentration, okay?

13

14

Q. Would that not in turn lead to an increase in the level?

15

16

A. What are we talking, are we talking level or talking concentration?

17

18

19

20

THE COMMISSIONER: We are really talking about the reading, I think, are we not?

21

22

23

24

25

THE WITNESS: Well, the reading is really imprecise, it is not fitting with the seriousness of this deliberation, I think we should use the word concentration.

Q. Well, the reading, Dr. Mirkin, obtained of 491 nanograms per millilitre is a concentration, is it not?





1

2

A. You are quite correct.

3

4

5

Q. So if we had this sample that was reduced by 50%, or 75% through the process of evaporation, would it not indeed lead to an increase in the concentration?

6

A. Correct.

7

Q. By the corresponding percentage.

8

A. You are quite correct.

9

10

Q. Because the digoxin would not evaporate.

11

A. That is quite correct.

12

THE COMMISSIONER: The serum would but the digoxin wouldn't?

13

14

THE WITNESS: The fluid in the serum would, fair enough. The serum, as you have heard I am sure, is composed of water, salt, protein and some fats.

15

16

17

18

19

THE COMMISSIONER: I am interested though in what you are saying about the distinction between concentration and level, doesn't the level signify the concentration?

20

21

22

23

24

25

THE WITNESS: Yes. I was thinking about that as we were talking. A reading doesn't mean anything, when you are assaying this material -- I don't want to go through this, you have been through







1

2

this so often, you obtain a reading on a curve,  
a number.

3

4

THE COMMISSIONER: Yes.

5

6

THE WITNESS: And that number then  
can be translated into a concentration, that is  
nanograms per ml. of material, or per gram of tissue.

7

8

9

10

THE COMMISSIONER: I guess we have  
been using, perhaps wrongly, we have been using the  
reading and the level as synonymous, that is what  
we mean.

11

THE WITNESS: Yes.

12

13

14

15

THE COMMISSIONER: We don't even  
know, I should speak just for myself, perhaps  
some of the learned counsel do, I have no idea of  
what figures you get before you get the final level,  
but that is what we are talking about.

16

17

18

19

THE WITNESS: Of course, yes.  
I think I would correct myself here, we could use  
level and concentration in synonymous, exchangably,  
and I think I would consider that perfectly appropriate.

20

21

22

Q. Dr. Mirkin, finally the  
fact that, the mere fact that this sample sat for  
ten months before the level was read, would that not  
in your view affect the reliability of the result?

23

24

25

A. No, it does not, with the





1

2

assumptions that we have discussed previously.

3

4

5

Q. That there was no evaporation  
and that there was no major alteration in the structure  
through something like boiling?

6

7

8

A. Yes. Or another possibility,  
if someone added a very strong acid or alkali,  
perhaps that might have modified the digoxin present  
in this serum.

9

10

Q. Is that sometimes done in  
a virology lab?

11

12

13

14

15

16

17

A. Not that I am aware of.  
I think if you exclude inadvertent mishandling of  
the specimen, things lie around for a long time, they  
just do and one can take the specimen and use it.  
So I would not feel that storage of these materials  
was in any way -- was to be considered as a reason  
for questioning the validity of the assay procedure.  
Do I make myself clear on that?

18

Q. Yes.

19

A. Good.

20

21

22

23

24

25







1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

C  
BM/PS

Q. Yes. Dr. Mirkin, yesterday you were asked some questions about medication errors. I would like to pursue that a little bit. I take it that from your experience medication errors do occur in institutions where medications are routinely given.

A. That is correct.

Q. And I believe you said that they are more likely to occur in a pediatric institution in that many calculations are required of dosages.

A. I think that is my perception of a problem that I don't know has received major attention, nor on which there is useful data.

Q. Well, I take it that when you provide opportunity for humans to make errors that indeed they do make errors on occasion.

A. Yes, we are all fallible.

Q. You also mentioned that the method of distribution may affect the number of medication errors that are made; I believe that is what you said. I take it that you are referring to something like the unit dose system.

A. Oh, yes. The method of internal drug distribution in the institution. Is that what you mean when you say distribution?





1

2

Q. Well, I believe those were  
your words and I just wondered what you meant by that.

4

5

6

7

8

9

10

11

A. Oh, good. I think that is  
probably what I was getting at where some greater  
uniformity can be provided by having the medication  
made up in a specialized unit and then distributed  
to the ward where it is to be used in contrast to the  
manner in which this was carried on at this institution  
formerly where the material, the drug was prepared  
at the time it was needed at the bedside of the  
patient.

12

13

14

Q. And very often by people who  
were under stress or who had a lot of other things on  
their mind at the same time.

15

16

17

A. Well, I hope they didn't  
have too many things on their mind. These are pro-  
fessional individuals, so, I think we shouldn't under-  
mine the competency of the staff there.

18

19

20

21

Q. No, of course not. But I  
take it that the theory of the unit dose system is  
that it is better to have people who are specially  
trained in drug preparation to be preparing and  
concentrating on the preparation of the doses.

22

23

24

25

A. That is the theory. It is  
like failsafe, it is as if we can't send a







1  
2 missile up unless somebody pushes a button. But the  
3 interesting thing is I have often wondered how well  
4 the theory has been tested. Now, we introduced -- if  
5 I may digress on this for a minute?

6 THE COMMISSIONER: Two minutes.

7 THE WITNESS: We have two minutes.  
8 We introduced unit dose into our institution based on  
9 a very similar premise. First of all, we were told  
10 it would reduce patient costs, which was a nice thing,  
11 even in a capitalist society like ours.

12 Now, the other thing is that we were  
13 told it was going to reduce the potential for error.  
14 Well, what you do is, you have somebody preparing it,  
15 presumably you have somebody checking the preparer  
16 and we really have had no data to identify how many  
17 errors do come out of a process of that sort. The  
18 presumption is, and I think it is a reasonable one,  
19 that that is going to have a better check or safety  
20 factor than when the drug is prepared under stress in  
21 the hospital at the bedside.

22 Now, is the pharmacist who prepares  
23 it under less stress than the nurse when the order  
24 comes down for a rush order for something, you know,  
25 it always has intrigued me.

Q. But I take it that you are





1  
2 not convinced that it is going to be an improvement  
3 on the system, but that you don't have any data to  
4 establish one way or the other.

5 A. Yes. But I think overall  
6 I would opt out and say yes, this is an improvement  
7 over what we have done and if I were going to modify  
8 the system I would go the way I think it has been  
recommended.

9 THE COMMISSIONER: This hospital has  
10 done that.

11 THE WITNESS: Has done that. So,  
12 I see nothing -- I am not being critical of it, it is  
13 just another perspective balance on this issue.

14 MS. McINTYRE: Q. I take it that  
15 this whole business about calculation is with respect  
16 to the type of error where there is a wrong dosage  
17 given and that the right drug is given to the right  
patient but the wrong dosage is given.

18 A. That happens, but it could  
19 be the wrong drug being given to the wrong patient.

20 Q. Yes, I was going to get to  
21 that next.

22 A. Yes.

23 Q. I take it you can also have  
24 cases where the right drug is given to the wrong  
25





1

2

patient. Like in the Inwood situation where Baby  
Inwood got Baby Pacsai's dosage of digoxin.

3

4

A. Well, I don't think the right  
drug is ever given to the wrong patient.

5

6

Q. Well...

7

8

A. I know what you mean, but we  
ought to have that in the record because I don't think  
that is what you mean, is it?

9

10

Q. I mean that a drug intended  
for one patient is given to another patient.

11

12

A. Yes.

13

14

Q. And the result of that could  
be that a patient not prescribed a drug would get it.

15

16

A. Yes, that must happen.

17

18

Q. The other possibility is of  
the same result, that the wrong drug is given to the  
right patient; in other words, one drug is prescribed  
and another drug is given in its stead.

19

20

A. Correct.

21

22

Q. And both of these are going  
to lead to a patient receiving a drug that wasn't  
prescribed.

23

24

25

A. That is correct.

Q. You told Ms. Cecchetto

yesterday that in your opinion it was unlikely that







1  
2 three patients on Ward 4-A/B could have received  
3 digoxin and yet not be prescribed it by error. I am  
4 wondering how you reached that conclusion, given the  
5 fact that there is so much digoxin given out on a  
6 ward such as this, that is, a cardiac ward.

7 A. Well, I must say that that is  
8 a very subjective interpretation. First of all, it  
9 gets back to my feeling about the professional staff.  
10 Now, the nursing staff on the intensive care wards are  
11 very professional, they don't make one -- slipups of this  
12 sort don't occur in a haphazard or random or in a  
13 manner that is casual, shall I say. Each patient  
14 has a medication record, each nurse, as I understand it  
15 this may not be the practice in this institution, but  
16 I presume it would be - each nurse is  
17 probably assigned to a given number of patients on  
18 the intensive care unit, so, she is assigned during  
19 that shift, she watches a certain number of patients.  
20 I find it difficult to understand how the incorrect  
21 drug could be given to the patient who had not been  
22 prescribed the drug. It is much easier to understand  
23 how an improper dosage of the correct drug can be  
24 given.

25 Q. But you agree with me that  
it occurs.





1

2

A. Oh, yes.

3

4

Q. The Inwood baby is an  
example. Are you aware that at the same institution  
in January of 1982 ---

5

6

A. No, wait a second. The  
Inwood baby is an example of what?

7

8

Q. Of receiving someone else's  
dose of digoxin.

9

10

11

12

13

14

15

16

A. Okay.  
Q. Now, in that case the Inwood  
baby had had a prescription of digoxin in the past  
but when she received the digoxin she was not supposed  
to.

17

18

19

A. Oh, I thought the baby had  
received an improper dose but the drug had been  
appropriately prescribed. But that's not what you're  
saying?

20

21

22

MS. McINTYRE: But the order was  
on hold at this time, as I read the chart.

23

24

25

A. Okay. Well, that is an  
important point.

MR. LAMEK: No, I don't think that's







1

2

right.

3

4

THE COMMISSIONER: No, I'm sorry, I  
don't think that's right.

5

THE WITNESS: I'm sorry.

6

7

THE COMMISSIONER: I think she was  
put on hold after the error, wasn't that right? Or  
am I wrong?

8

9

10

MR. LABOW: No, Mr. Commissioner, you  
are wrong. It was on hold prior to the child receiving  
the mistaken dose.

11

12

MS. McINTYRE: That was my under-  
standing.

13

14

THE COMMISSIONER: Well, then, we had  
better check that out because that wasn't my impres-  
sion, but you are no doubt right if you say so.

15

16

17

MS. McINTYRE: It was on hold, as I  
understand, there was an order made on March 11th for  
digoxin 0.0006 milligrams.

18

19

20

THE COMMISSIONER: All right.

MS. McINTYRE: And it was on hold,  
never given and it was on the 12th at 5:30 a.m.

21

22

THE COMMISSIONER: I have the  
incident report, but you say the hold was -- all  
right, I had better make a note of that.

23

24

25

MR. LABOW: Mr. Commissioner, the





1

2

EKG had shown signs of digoxin toxicity on the

3

child's admission and that is why digoxin had been

4

ordered held.

5

THE COMMISSIONER: Okay, I apologize,  
Ms. McIntyre, you are right. It has happened before.

6

7

MS. MCINTYRE: The first time, I  
believe, Mr. Commissioner.

8

THE COMMISSIONER: No no, no no.

9

10

MS. MCINTYRE: Q. So, Dr. Mirkin, I  
think we are in agreement now that this baby had  
previously been on digoxin but at the time she re-  
ceived this does in error the order was on hold.

11

12

13

A. Okay.

14

15

16

17

18

19

20

Q. So that the patients were  
confused. I was going to ask if you were aware that  
at the same institution in January of 1982 there was  
a confusion not between patients but between drugs  
where epinephrine was confused for vitamin E on  
five occasions in one month leading to a patient  
receiving a medication that was not prescribed.  
So, you would agree with me that it does happen.

21

22

23

24

25





12jan84

D

DPrC

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. I think I have agreed with you that it does happen. I also have reached the conclusion that it would be very unusual to have digitalis administered to patients who had not been prescribed that drug or a drug similar to digoxin for their treatment. I still would feel that way. That is not to state categorically that these events could not ever have happened.

Q. That is your subjective impression?

A. It has to be entirely that.

Q. Fair enough.

I would like to ask you briefly about Justin Cook, and I believe that you have been provided with the chart, where the possibility of a medication error has been considered by this Commission and, just to remind you of the sequence of terminal events in this child, on March 21, in the evening, about six o'clock, the child had a severe blue spell and was given propranolol by the doctor and responded immediately and well to that medication. The child experienced another, from what I can gather, similar blue spell, at least the clinical symptoms at approximately 3:45 and was administered two doses of propranolol, totalling







D2

1  
2 6 mg. There was no positive response shown. The  
3 child went through a series of changes. A sample  
4 of blood was taken at 4:30, which gave a level of  
5 72 nanograms of digoxin. The resuscitation attempt  
6 continued until approximately five o'clock, at  
7 which time the child was pronounced dead and, post  
8 mortem, there were quite high levels found in the  
9 tissues of digoxin.

10 First of all, I would like to ask  
11 you whether, in your opinion, given the fact that  
12 the child responded to propranolol at 6:00 p.m.,  
13 when he suffered the first blue spell, would you  
14 expect him to have responded to the same drug for  
15 the same symptoms?

16 A. The response/<sup>if patients</sup>with cyanotic  
17 disease to propranolol is very variable. I think it  
18 is almost impossible to state with certainty that the  
19 patient would have responded to the second dose of  
20 the propranolol. We have had extensive experience -  
21 and I am sure the cardiologists at Sick Children's  
22 are very skilled and knowledgeable about this - where  
23 the drug did not produce a satisfactory response the  
24 second time around. I would say it is not unusual,  
25 let me put it that way.

Q. Would you have anticipated,





D3

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

in the circumstances, that there would have been a positive response? Is it more likely than not that there would have been a positive response?

A. Obviously, the doctor's presumption was, yes, there was going to be a response, and one does not initiate an intervention in these conditions without the presumption that it is going to be beneficial to the patient. So their presumption was, yes, of course, and it would have been my presumption under the conditions that, yes, I would have got a positive response. But they did not.

Does that infer that something else was given? No. I would not reach that conclusion because of the lack of response.

Q. Atropine was also given and that produced a response shortly after the 6 mg. of propranolol was given.

A. That is correct.

Q. Does that help you in deciding whether or not what was supposed to be propranolol was propranolol, or whether it might have been digoxin? Does that help in any way?

A. No, it really does not. I think there are some suggestions here that this drug







D4

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

might have been propranolol. For example, the heart rate of this patient was 140 beats per minute. At the time the patient had the cyanotic spell, at least according to my records - this is the last one --

Q. I had thought, doctor - sorry for interrupting, but I had thought that the 140 heart rate was after the atropine was administered.

If you would like to look at the chart, at page 27, or page 29, there is a fairly detailed summary of the events that occurred. It says that the heart rate decreased 80 to 100 beats per minute after the propranolol was given.

A. Had decreased; is that correct?

Q. Yes, on page 27.

A. Yes. Now, the effect of propranolol on heart rate is precisely that. That is, the effect of that drug on the heart rate would be to slow it.

Q. Okay.

A. Okay. So, I made my statement a moment ago in response to your query about whether or not the data in the chart would support the view that this was or was not propranolol that



D5

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

was given. Based on that reduction in heart rate, I would tend to conclude that that, indeed, was propranolol that had been given to the patient; though, of course, there is no precise evidence that, indeed, it was.

Q. The response to atropine would be to increase the heart rate?

A. That is correct.

Q. Why would they want to give two drugs; one to decrease the heart rate and one to increase the heart rate? I don't understand that.

A. That is a good question. I think the reason that the propranolol is given is not to decrease the heart rate necessarily but to increase the oxygenation of the blood and, in this particular patient, to allow blood to circulate more effectively into the lungs and to become oxygenated, because this patient had what you describe as a blue spell - we would describe it as a cyanotic spell. The blue spell is due to the fact that the blood is not adequately oxygenated.

Q. Can I ask you this, Dr.

Mirkin --

A. I thought you wanted an explanation.





D6

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. I'm sorry, I thought you  
were finished.

A. No, I am not.

If you do want an explanation, we  
will do it. If you don't, we don't have to.

THE COMMISSIONER: I do.

MS. MCINTYRE: I'm sorry.

A. That's okay. I am not  
irritated or anything - it is just that my voice  
sounds that way.

That is an excellent point: Why  
do you give a drug that might slow the heart rate  
and then follow that up the next moment with one  
that will increase it?

You asked that question and I was  
trying to respond intelligently to it.

The drug is given, the propranolol  
is given to increase the oxygenation of the blood;  
not to slow the heart rate, but drugs have all kinds  
of strange effects. This drug will relax certain  
blood vessels, allowing more blood to get into the  
lungs, get oxygenated until the baby gets pink. That  
is the real objective of the propranolol.

Q. That did not occur in the  
second case?







D7

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. It did not the second time,  
that is right.

Q. The heart rate slowed but  
the baby did not get pink.

A. Exactly correct.

Now, the physician, when confronted  
with that situation, said, well, we had better give  
something because if this baby's heart rate gets too  
low, this baby will go into acute congestive failure  
and die on us. So, they gave atropine, which tended  
to increase the heart rate, and that is the 140 I  
think we are talking about - from 80 to 140. So,  
that is the basis for that manoeuvre.

I hope that is reasonably clear.

Q. I think I understand that.

Can you tell me whether, if digoxin  
was in fact given, rather than propranolol, at 3:50  
or 3:55, is it possible that the effects of that could  
have resulted in the death of the child within  
approximately half an hour to forty minutes?

THE COMMISSIONER: I think we had  
that exact question yesterday, but we will try it  
again and see if we get the --

MS. MCINTYRE: I am not sure that I  
understood the answer.





D8

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

THE COMMISSIONER: Do we not have that question, I think almost in those words?

THE WITNESS: I hope I am giving the same answer.

THE COMMISSIONER: Yes.

THE WITNESS: It is terrifying.

My sense of it is, yes, certainly, the effects might be manifest, provided that the patient received a sufficiently large dose.

As I understand my calculations here, this patient did not receive a very large dose because, even if the digoxin was given - and let us assume the pediatric dose --

MS. MCINTYRE: Q. Let us assume an adult dose because I think we all know that if it was a pediatric vial of digoxin, it would be a very, very small dose.

A. Yes. I think you have heard testimony from Dr. Kauffman and probably from Dr. Spielberg as well.

This would have come out roughly I think, according to my calculations, at about 150 micrograms total dose; correct? If one used the adult vial, making that assumption.

Q. Okay.







D9

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. That is a good dose of drug and it might have produced some adverse effects. I think, though, if you go further and ask me whether that would produce the blood level of 100 micrograms per ml. that we saw - or was it?

Q. 72.

A. 72, I beg your pardon. I don't think that we could really buy that.

Q. And you are basing that on the same calculations as Dr. Spielberg and Dr. Kauffman used?

A. I think reasonably on that premise and even on my own calculations that we did at Minnesota.

THE COMMISSIONER: You will be happy to know, doctor, that that is what you said yesterday.

THE WITNESS: Senility has not set in too quickly!

MS. MCINTYRE: Thank you very much.

THE COMMISSIONER: Thank you, Ms. McIntyre.

Mr. Young, I think you said you were not going to question this witness; is that right?

MR. YOUNG: I have no questions, Mr. Commissioner.





D10

1

2

THE COMMISSIONER: Mr. Knazan.

3

CROSS-EXAMINATION BY MR. KNAZAN:

4

Q. Doctor, my name is Brent

5

Knazan and I represent Marianna Christie. She is  
a Registered Nursing Assistant.

6

7

I would like to ask you about

8

Baby Jesse Belanger, who is your No. 18.

9

10

This baby you put into your second  
category because there was digoxin in tissue after  
exhumation even though no digoxin had been prescribed.

11

A. Please go on.

12

13

14

15

Q. You put it in your second  
category for that reason and I understand that the  
most you can say is something qualitative; that is,  
there was digoxin in the baby and the digoxin had not  
been prescribed.

16

17

Can we not say a little more than  
that?

18

19

20

21

Maybe I should first refer you to  
Mr. Cimbura's findings, on which, I presume, you  
relied. That is 95E of the Cimbura document,  
September 29, 1982.

22

23

24

25





DM.jc  
E

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. I don't have that, those numbers.

Q. It is just two readings and I can put them to you.

THE COMMISSIONER: I will give you that, Doctor, there it is and I will get my own out.

MR. KNAZAN: Thank you.

THE WITNESS: Thank you very much. Okay.

MR. KNAZAN: Q. 253 nanograms in liver and 43 in muscle, those were the only two readings and the baby was not prescribed digoxin. So we can say at least not only was digoxin given, that is once we are starting from the premise that this is the cause of death, but that enough was given to cause the baby's death, that is part of the premise?

A. That is your premise?

Q. No, you put it in your second category.

A. Yes.

Q. And I understood from your evidence that the reason you put it in your second category is that there was digoxin in tissue?

A. Yes, okay.

Q. And no digoxin was prescribed?







E.2

1

2

A. Okay, yes.

3

4

5

6

Q So starting from it being in your second category, we can at least then say something more, and that is enough was given to cause death, if that was the cause of death?

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. Yes, I think that one would have to conclude that.

Q With this limited data, the baby was five weeks old with a birth weight of 3,080 grams, I don't have the weight just before death that I have been able to find, are you able to say anything about the minimum amount of time that would have been required for the digoxin which caused the death to distribute into the baby's body; that is are you able to give a time, at least a minimum amount of time prior to arrest that the administration would have occurred?

A. Yes. Then the assumption, the further assumption I guess must be made that the route of administration in this child was into the thigh, or not? I think as you recognize that is going to significantly influence the time parameters that are selected.

Q All the assumptions that Dr. Spielberg, MacLeod and Kauffman made, and that





E.3

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

was they have specifically referred to location, but only that it was administration by I.V. So perhaps you could answer on the assumption that it was the place of entry, was the place where it would take the least time to kill the baby?

THE COMMISSIONER: The I.V., what is it normally?

THE WITNESS: The intravenous, well, it can be the arm, it can be the jugular vein through here (indicating), in some babies it can be a scalp vein. I don't know what the I.V. route was on this child.

Let us assume, and I think it is a reasonably safe assumption that regardless of the site at which the I.V. was presented, it very rapidly would get into the circulation and it is almost an instantaneous injection. Now, one has to make certain kinds of assumptions here. I am sure you have heard these but I think I have to go through them quickly. One is if the material is injected directly into the vein at a site very close, proximal is the term, very close to the vein, that means one could pump the drug in very rapidly within the course of less than a minute. Under those circumstances one would be injecting a bolus of drug, a high concentration







E.4

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

in small volume, and that of course would allow almost instantaneously, well, let us say within minutes, high concentrations of the drug to be achieved in a variety of different tissues. Depending, and I didn't see this mentioned in some testimony, depending on the blood flow to different organs. Now these drugs are carried by the blood and if an organ for one reason or another has impaired blood flow the drug will not be distributed to it very effectively. Now in this case the patient's liver had substantial concentrations and also in the muscles. I would say that one could see toxic effects from an overdose given I.V., oh, within half an hour, probably half an hour to an hour, reasonably, and one might even see them earlier.

Q. Would less than half an hour be unlikely?

A. Depending again on how much was given. If it was given in the manner I just described one could see toxic effects within 15 minutes.

Q. You indicated to Mr. Lamek that you had read Dr. Spielberg's evidence to this Commission?

A. Not word for word, but I read as much of it as I could, yes.





E.5

1

2

3

Q. And you read Dr. Kauffman's  
report, or his evidence?

4

A. I have looked through it, yes.

5

Q. But not the eight volumes or so  
of evidence?

6

A. No, I just have his summary.

7

Q. I just want to put one question  
and answer from Dr. Kauffman's testimony and just  
ascertain, I think you are slightly disagreeing with  
him and perhaps you can clarify it for me. The  
question was, this is page 8059 of Volume 83.

11

12

A. Is that available?

13

THE COMMISSIONER: Yes, it probably is,  
8059 of -- ?

14

MR. KNAZAN: Q. 8059 of Volume 83.

15

16

A. If you want to read it I will  
try and follow you.

17

Q. Yes, I am reading at line 24:

18

"It is my understanding that  
digoxin was found in the tissues  
after exhumation. Doctor, am I right  
in saying that because digoxin was  
found in the tissues, ... "

19

20

21

22

MR. YOUNG: Excuse me, Mr. Knazan, I  
wonder if you might give the doctor the page number.

23

24

25





E.6

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

MR. KNAZAN: Q I am sorry, 8059 of  
Volume 83. I am starting at the last line of the  
page, line 24, the first part is just an introduction  
to the question:

"It is my understanding that  
digoxin was found in the tissues  
after exhumation. Doctor, am I right  
in saying that because digoxin was  
found in the tissues, it would be  
unlikely that the dose could have  
been given to that child within an  
hour of death because that would not  
have allowed for - had it been given  
within an hour it would not have had  
time to distribute?

"A. Well, there probably is some  
distribution within an hour, but it  
is hard to predict in a given patient  
to what degree, and the concentrations  
of course achieved would depend on  
the dose. It is hard, as I said, to  
quantitate the concentrations in the  
liver. I think we have to say that  
some distribution did take place in  
this child. To what degree we do not







E.7

1

2

"have enough information to speculate about that.

3

4

"But I think that it is unlikely that the dose was given much less than an hour because there is some digoxin in the skeletal muscle and in the liver. There are so many uncertainties in this patient because of lack of information that it is very difficult to be specific about that."

5

6

7

8

9

10

11

Do you more or less agree with that?

12

13

A. No, I don't.

14

Q. You don't agree with that?

15

A. I think it is possibly more specific.

16

Q. More specific?

17

A. There are some studies, and I

18

think studies that we have done in our laboratory,

19

which show the distribution of this drug to the

20

skeletal muscle in animals, pregnant animals, and

21

the time frame is much shorter. Now whether that has

22

application to the clinical, to the human situation,

23

must be considered, but I would say that in the

24

animal model one can certainly see distribution to

25





E.8

1  
2 these tissues. To say that distribution is not  
3 occurring early on is not what Dr. Kauffman is saying.  
4 Dr. Kauffman is saying that distribution, in his own  
5 words, does go on and indeed he is perfectly correct  
6 in that. The rate at which the compound gets into  
7 different tissues varies, as you know. There is a  
8 rate constant for movement of these drugs, these  
9 molecules, into different tissues. The rate at which  
10 that occurs will ultimately determine the concentration  
which is achieved as steady state.

11 The point I am trying to make is that  
12 if the drug is given in I.V. manner in a bolus  
13 injection, I would say that one could find a rather  
14 ubiquitous distribution. However, it is clear that  
15 the earlier - the shorter the duration after injection  
16 the lower the concentration probably. The higher  
17 concentration would be achieved after a longer period  
of equilibration or distribution as you have said.

18 Well, I don't know whether we really  
19 differ on this, Kauffman and myself, or Spielberg,  
20 but I think I would conclude that even in a relatively  
21 short time the time frame of half an hour that I gave  
22 you, that one might, one would find as I say, I will  
be more specific than that, drug in the tissues.

23 You see, if one postulates that one  
24  
25







E.9

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

is going to produce an effect with a drug within half an hour well it must reach the tissues, correct, you follow that, don't you?

Q. Yes.

A. Good.

Q. It would have had to cause death as well?

A. Well, whether it necessarily would cause death I don't know, but it would produce an effect. Now if the concentration is high enough obviously it will produce an adverse effect that might lead to death.

Q. You answered that very thoroughly. Could we just turn to Justin Cook.

A. Excuse me, I have one of the --

MR. YOUNG: That is all right, you can keep it for a while.

THE WITNESS: Thanks.

MR. KNAZAN: Q. When you testified the first day, on Tuesday, about Justin Cook, you were concerned with the accuracy of the time of the sample taken during the course of arrest; I am referring to Dr. Mirkin's evidence at page 8869 of Volume 87 on Tuesday. Certainly that is where Mr. Lamek's question is. You were very concerned





E.10

1

2

about the time of the sample being precise, page 8872;  
you raised Cook from 0 to 9, and you said:

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

"I think, if the data, in reviewing  
this again, if those time points  
are actually precise, and I conclude  
they might be, or it is not certain,  
but, if they are precise, then I think  
we can switch this to a rating of 9  
based on that technical distinction."

Am I right in interpreting your:

" ... or it is not certain but,  
... ",

as recognizing that even though death was pronounced  
at a certain time it might have occurred earlier  
during the resuscitation attempt, is that what you  
meant by that or something else?

A. No, that is not what I actually  
meant and I am sorry it came out in this ambiguous  
manner. What I was attempting to get at was really  
the time frame between death and that final blood  
specimen, the one at 0430, I had assumed that that  
was a post mortem specimen. As we have heard through-  
out these last few days, the scoring system was based  
on the use of ante mortem information not the post  
mortem.





E11

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Now, I made the switch here in the testimony when I was informed that this was indeed an ante mortem level. I had interpreted it as a post mortem level and that was strictly my own interpretation based on the information I thought existed in the chart. Now we know that it is ante mortem and I think that when an individual presents with that concentration of drug in the body one has to think very strongly of intoxication as a consequence of it.

Q. We have heard evidence, I can refer anyone to it, that the pronounced time of death is not necessarily actual death in the sense that death can occur during resuscitation and the choice of the pronounced time of death might be arbitrary, would that make a difference?

-

-







1

2

Would that make a difference if the  
sample was indeed post mortem in that sense?

4

5

6

7

8

9

A. Well, I would say this  
much, that in this particular individual if that  
was indeed a post mortem specimen it might have some  
bearing on the quantitative magnitude of the serum  
level and concentration that we assayed in that  
specimen, but the fact remains that that drug was  
there.

10

11

Q. And the baby was not pre-  
scribed it.

12

13

A. And was not supposed to be  
there and I think that is a very disturbing fact.

14

15

16

17

18

19

20

Q. Just one other point.  
Yesterday in answer to Ms. McIntyre's question I  
believe you testified that a person with a modest  
degree of experience could see a dig. effect on the  
oscilloscope if a baby was on a cardiac monitor  
and then she asked you by that do you mean doctors  
and you said yes. I want to make that very clear by  
modest degree of experience you weren't referring to  
a nurse on the cardiac ward.

21

22

23

24

25

A. Oh. Well, I think what we  
ought to do is restrict that to cardiologists. Well,  
you know, I think many of the nurses are very skilled





1  
2 in being able to discern these findings as well and  
3 it would not surprise me to find that many of the  
4 nurses on the intensive care ward could also pick up  
5 those findings very easily.

6 THE COMMISSIONER: It is the cardiology  
7 ward that we are perhaps concerned with. Is that what  
8 you meant by the intensive care?

9 THE WITNESS: Oh, I'm sorry, I guess  
10 I am using that incorrectly as a matter of fact.

11 THE COMMISSIONER: The cardiology ward  
12 is a special ward but not an intensive care ward, or  
13 at least they have an intensive care ward as well.

14 THE WITNESS: Okay. I have been using  
15 using these interchangeably and I think incorrectly.  
16 We have a situation where many of the cardiology  
17 patients are cared for in the intensive care unit, I  
18 am sure that is true here as well, is it not?

19 THE COMMISSIONER: It is true as well  
20 but our concern is mainly with the cardiology ward, not  
21 the intensive care ward.

22 THE WITNESS: Okay.

23 THE COMMISSIONER: There was only one  
24 baby, Pacsai, that died in the intensive care ward.

25 THE WITNESS: Well, I hope that hasn't  
been confusing to anyone. Certainly the nursing staff







1

2

in the cardiology ward I would bet had been trained  
and were experienced in this. It would be interesting  
to find out.

4

5

MR. KNAZAN: Q. Now that we have the  
nurses involved...

6

7

A. Pardon me?

8

9

10

11

Q. Now that we have the nurses  
involved I have to take it a little further. As I  
understand it on a printed EKG If you were asked for  
a printout you have 12 leads; that is, 12 indicators  
of various actions in the heart, is that correct?

12

13

A. I think that is generally the  
case.

14

15

Q. And on the oscilloscope  
or the TV screen you only have one lead.

16

THE COMMISSIONER: I'm sorry, only  
one what?

17

MR. KNAZAN: Lead.

18

THE COMMISSIONER: Lead?

19

MR. KNAZAN: Yes. Could you explain  
what a lead is?

20

21

A. One of the wires that comes  
out. There are 12 wires.

22

23

THE COMMISSIONER: Before you go  
into this too deeply are you sure I have to know about

24

25





1

2

it?

3

MR. KNAZAN: Well, I noticed you  
writing yesterday, Mr. Commissioner.

4

5

6

7

8

9

THE COMMISSIONER: Well, I am writing  
but I am not too sure I know what I am writing, that's  
the point. I had just thought it was a monitor and  
I thought that anybody could read it but now you are  
leading a question as to whether this monitor can be  
read. Is that it?

10

11

12

MR. KNAZAN: Whether it is as good an  
indicator as a printed EKG sheet if someone activates  
the printout. That is all I am trying to establish.

13

14

15

THE COMMISSIONER: We have had all  
kinds of evidence of nurses having noticed the monitor  
showing some sudden heart change in the baby. Are you  
questioning whether they can do that on a monitor?

16

17

18

MR. KNAZAN: I am questioning whether  
a person with a modest degree of experience could  
see a dig. effect.

19

20

21

22

23

24

25

THE COMMISSIONER: Yes, all right.

THE WITNESS: I can answer your  
question, the one you just raised, and that is, that  
the twelve channel information is obviously much more  
informative than the lead to, so to speak, on the  
oscilloscope, that you can see on the oscilloscope,





1  
2 I think that is generally accepted. However, I would  
3 stick to the view that with major arrhythmias occurring  
4 I would be willing to bet that 90% of the nursing  
5 staff on that unit could pick it up and I would bet  
6 if it is done they are skilled there.

7 MR. KNAZAN: Thank you. Those are  
8 all my questions.

9 THE COMMISSIONER: Yes, all right.  
10 Thank you. Mr. Olah?

11 MR. OLAH: Sir, did you wish to take  
12 your morning break before I commence my examination?

13 THE COMMISSIONER: The answer is no be-  
14 cause we started at 9:30 but if you're not ready  
15 perhaps Mr. Labow will spare you.

16 MR. OLAH: No, I am ready to pro-  
17 ceed, sir.

18 THE COMMISSIONER: Or did you want to  
19 take a morning break?

20 THE WITNESS: I have a problem.

21 THE COMMISSIONER: Oh, by all means.

22 THE WITNESS: No, no, it is not a  
23 real desperate one. I was asked to read something last  
24 night and I didn't read it very well.

25 THE COMMISSIONER: Was that by Mr.  
Olah?







1

2

MR. OLAH: That is correct, sir.

3

4

THE COMMISSIONER: Well, I don't know  
that you are under orders to do that.

5

THE WITNESS: Oh, no, no.

6

THE COMMISSIONER: I don't think you  
need apologize too much for it.

7

8

THE WITNESS: I am apologizing, I  
want to be a very cooperative witness.

9

10

11

12

13

THE COMMISSIONER: Well, how long is  
this article, whatever it is? We may have to take  
two breaks but we obviously couldn't take a break --  
well, I suppose we could take a break now, but we  
will go on until 1:00.

14

15

16

17

MR. OLAH: Well, maybe I can assist  
you, sir. What I was hoping to do was, I had  
asked the witness to read my cross-examination of  
Dr. Hastreiter in an effort to speed up my cross-  
examination, basically talking about time and ---

18

19

20

THE COMMISSIONER: Well, can you  
save that to the end? I don't know how long you are  
going to be. How long are you going to be?

21

22

23

24

25

MR. OLAH: Well, that was going to  
be the bulk of my examination. I can get started  
on something else, but that's the bulk of the  
examination.





1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

THE COMMISSIONER: Well, how long was your cross-examination? If it was a half an hour it will take him a half an hour to read it.

MR. OLAH: Well...

THE COMMISSIONER: Let's see if we can spare this. Mr. Labow, can you go on now?

MR. LABOW: Mr. Shinehoft is prepared to go on.

THE COMMISSIONER: Mr. Shinehoft, can you go on?

MR. SHINEHOFT: Yes, sir.

THE COMMISSIONER: All right. Well, you stand down and we will take Mr. Shinehoft now and then we will take you after the break. Is that appropriate?

MR. OLAH: Perfect, thank you very much, sir.

THE COMMISSIONER: We have a great habit for ruining breaks for witnesses. You see, the rest of us just go out and drink coffee, but you have to read.

---Discussion off the record.

THE COMMISSIONER: Yes, Mr. Shinehoft?

MR. SHINEHOFT: Thank you, Mr.





1

2

Commissioner. I don't know how much help I am going  
to be because I don't intend to be very long.

4

THE COMMISSIONER: Well, I am not the  
one to encourage you to be any longer.

5

6

MR. SHINEHOFT: But if you really want  
me to, I will.

7

THE COMMISSIONER: No.

8

CROSS-EXAMINATION BY MR. SHINEHOFT:

9

10

11

12

13

Q. Doctor, my name is Jack  
Shinehoft and I represent the parents of the baby,  
Kevin Pacsai, and I believe you have given evidence  
that you personally were the doctor to review this  
child, is that correct?

14

A. That is correct.

15

16

17

Q. I believe you are aware,  
Doctor, that this baby attended at three different  
hospitals on three different occasions. Did you  
examine all three hospital records?

18

19

20

A. Yes, in my notes I have observa-  
tions that were made at St. Joe's Hospital, at  
McMaster and at Sick Children's, is that correct?

21

22

23

24

25

Q. That is correct, Doctor. You  
are aware that this baby attended St. Joseph's  
Hospital first and then went to McMaster and then was







1

2

finally transferred to the Sick Children's Hospital.

3

A. That's my understanding.

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. Did you know why he was

transferred to Sick Children's Hospital; in other words, was it for treatment purposes or was it for what they call a workup purpose?

A. If I may go back to St.

Joe's for a minute. This patient presented with a description of heart speeding up and slowing down.

So, there was some evidence of an arrhythmia at this time. This is on March 7th of 1981.

Q. Yes.

A. The patient actually became

very ill at St. Joe's Hospital and experienced shock and was treated very aggressively. Is that correct so far?

Q. That's my understanding,

Doctor.

A. Yes. And then on March 8th

I believe the baby was transferred to McMaster, or was it on the 7th, I have here on the 8th, and the baby seemed to be doing reasonably well at McMaster, good color, perfusion was good, but the baby did need some supportive therapy at the time and was placed on digitalis at McMaster. Actually, the baby





1

2

was given some digitalis at St. Joe's Hospital as  
well, I have a small dose here. Is that correct  
so far?

4

5

Q. That is my understanding as  
well, Doctor.

6

7

8

9

10

11

A. Yes. And then the baby was  
transferred to Sick Children's Hospital, I would pre-  
sume, because there was still some difficulty in get-  
ting the heart rate to slow down. It was my under-  
standing that the child was brought here for treat-  
ment and I would presume maybe further diagnosis.

12

13

14

Q. Would you care to comment  
on the child's condition upon his arrival at the  
Hospital for Sick Children?

15

16

17

A. Well, I have a note here.  
On March 11th -- now, the baby was in McMaster on  
March 8th, 1981 and I presume the transfer, was it  
completed on March 11th, to Sick Children's Hospital?

18

19

20

21

22

Q. That is correct, Doctor.

A. At 3:30 my notes indicate  
the baby had a heart rate of 150 with a normal  
rhythm, everything else looked pretty good, chemistries  
looked good. I have here, "considered stable." I  
have taken that out of the record.

23

24

25

Q. Yes, other doctors have





1  
2 given evidence, Doctor, that they felt that upon his  
3 arrival at the Hospital for Sick Children the baby  
4 was relatively stable and in relatively good condi-  
5 tion. Would you agree with that?

6 A. I think from the record one  
7 has to conclude that. Now, that is at 3:30?

8 Q. Yes, upon his initial ar-  
9 rival at the hospital.

10 A. Yes.

11 Q. And you indicated in your  
12 evidence, Doctor, and I can refer you to the page and  
13 line number, that you did not consider the death of  
14 this baby unanticipated. It would be a logical conse-  
15 quence of what we observed. I believe you meant, and  
16 correct me if I'm wrong, Doctor, that this was as a  
17 result of his being given an overdose of digoxin, is  
18 that correct?

19 A. That is my intent, yes.

20 Q. Now, would you expect this  
21 child to die or to have died based on the clinical  
22 picture if there had not been this digoxin administered?

23 A. I don't believe I would  
24 have anticipated that.

25 Q. Well, you also indicated in  
your evidence, and I have the page and reference







1

2

number, Doctor, it is page No. 8904, line 13, that  
you have no explanation for the elevated potassium  
levels in this child. Do you recall giving that  
evidence, Doctor?

5

THE COMMISSIONER: What page?

6

MR. SHINEHOFT: 8904.

7

THE COMMISSIONER: What volume is

8

that?

9

MR. LAMEK: Volume 87.

10

THE WITNESS: Yes, I recall it.

11

MR. SHINEHOFT: Q. You recall giving

12

that evidence?

13

A. The basis for that state-

ment ---

14

Q. Well, I wanted to talk to you

15

about the basis of that statement.

16

A. Yes, the basis of that state-

17

ment, when I reviewed the medication record there was

18

an increase in potassium from 3.7 to 7.7 in less

19

than 12 hours and I could find no administration of

20

potassium noted. I couldn't find it, but perhaps

21

it was there.

22

Q. But is it not true, Doctor,

23

that an elevated digoxin level will cause an elevated

24

potassium level?

25

25





1

2

A. I have heard that bandied

3

about.

4

Q. Well, Dr. Kauffman says

5

that there is literature that would indicate that

6

this is in fact the case and he has given evidence

7

about the concept of the competition for the binding

8

sites and the moving of the potassium which is, and

9

correct me if I am wrong, an intracellular solution

10

or substance outside the cell. Is that not correct,

Doctor?

11

A. Well, that can occur and I

12

think we have published data in the New England

13

Journal on such an effect occurring in patients

14

receiving digitalis intoxication and that is available

15

for you. But the change in serum will require a

16

tremendous amount of potassium coming out of the cell.

17

Q. Well, isn't it true that

approximately, I have the exact ---

18

THE COMMISSIONER: I'm sorry, change

19

in the ---

20

THE WITNESS: Serum concentration

21

of potassium from 3.7 to 7.7, in my opinion, would

22

require an awful lot coming out of the cell based on

23

the mechanism that you are proposing. Do you follow

24

me?

25





1

2

MR. SHINEHOFT: Q. I understand that.

3

But it is my understanding, Doctor, that if you had a

4

level of 100 potassium inside the cell that you would

5

only have something like 4.5 nanomoles per milli-

6

litre outside the cell. Would you agree with that?

7

That is, for the most part, the great majority of

8

potassium is inside the cell as opposed to outside

9

the cell.

10

A. That's all correct, that's

all correct.

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25







12jan84  
G  
DPrC

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Q. Dr. Kauffman has given evidence that there could be a shifting from inside to outside the cell in a number of ways, one of which is through the administration of digoxin and the competition for the binding sites and another way, of course, is if the pump breaks down completely, if there is an overwhelming amount of digoxin then the pump might be shut off.

Again, would you agree with those possibilities, doctor?

A. I would agree with the analysis of the mechanism of action or the analysis that digitalis affects both those processes, yes, with what you have said. I would agree with the fact that the digitalis can influence the intracellular accumulation of potassium.

What I think I have some trouble with is presuming that the amount of potassium released by the administration of digitalis could be responsible for producing an increase of an almost 4 to 5 milliequivalents per litre of potassium. One way that might have occurred is if you have cell death - that is one thing - and the potassium just gets extruded out into the circulation.

Q. Death of the tissue, and that





G2

1

2

is why he had such an elevated reading after death.

3

4

5

6

Some of the pathologists have said that they are not concerned about potassium levels in serum after death because it is released by the cells.

7

Do you agree with that, doctor?

8

9

10

11

A. I think I would certainly be in agreement with that particular position, yes. However, we are talking now about ante mortem change of about 4 or 5 milliequivalents - that is a lot; I don't care what anyone says.

12

Q. I am aware of that.

13

14

15

A. I am sure you are. That is a lot. I am not that willing to accept at this hearing that that could have been induced by the mere administration of digoxin.

16

17

18

What I would like to do, if I may, is to perhaps make some attempt at making a calculation for you on that and submitting it to you.

19

20

Q. I have had the calculations done, I can tell you, doctor.

21

22

Let me ask you a couple of other things before we get into the calculations.

23

24

25

First of all, do you agree that his renal function was not abnormal? He had a normal BUN.





G3

1

2

Is that correct?

3

A. As best we can tell, that

4

is normal, yes.

5

Q. Less than 5, I think it was.

6

A. I think that is certainly --

7

I would agree with you on that.

8

Q. And that he was not

9

administered any potassium, according to the drug  
information that we have.

10

A. That is my understanding as

11

well.

12

Q. It is my understanding that

13

if you did the calculation and he had no renal

14

function whatsoever, making that assumption, then

15

the body could not endogenously - that is, of itself -  
produce the level of increase that occurred in this

16

child; would you agree with that?

17

A. That the body could not...?

18

Q. In other words, if the kidneys

19

were shut off completely and you just had it compounding

20

the effect of potassium, it would not have risen

21

from the level of 3.7 to 7.7 in the timeframe that  
occurred in this child.

22

A. In less than 12 hours?

23

Q. That is right.

24

25







G4

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. That is probably a reasonable assumption.

Q. So, therefore, would you not agree that something else, other than lack of renal function, must have happened? Is that a fair assumption?

A. I think that is what I am getting at.

Q. What do you say happened?

A. I don't know. I don't know whether this patient was inadvertently administered potassium - that is one scenario.

Q. We don't have any drug medication error reports, which is commonplace and normal, is it not, in a hospital where there has been a drug inadvertently or by error administered to a patient?

A. There is no record when a drug is administered by error; you don't have --

Q. If it is a known error.

A. Exactly. We did not have any information that digitalis was given to these kids either, but we determined digoxin was present by analyzing for it. The same reasoning could apply here. We have analyzed and have found potassium in





G5

1

2

the serum of this patient. How did it get there?

3

You would suggest it is there because of the effect  
4 of another drug. I might take the argument and say,  
5 well, that potassium was given as potassium to this  
6 patient.

6

7

Q. If you accept that, doctor,

7

let me ask you this: It is fairly commonplace, is

8

it not, for small babies with congenital heart

9

problems to be administered digoxin?

10

A. Correct.

11

Q. Would you say the same is

12

true of potassium?

13

A. Absolutely not.

14

THE COMMISSIONER: What is the  
15 effect of administering potassium?

15

THE WITNESS: Generally, to decrease

16

the heart rate and decrease the excitability of

17

the heart. Those are effects that are quite opposed

18

to digoxin effects.

19

MR. SHINEHOFT: Q. So, you would

20

agree with me, doctor, that it is common to administer

21

digoxin in the environment in which this baby was

22

placed but not very common to have potassium  
23 administered?

23

A. Very uncommon, unless the

24

25





G6

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

doctor felt that there was some reason to give  
potassium to the patient.

Q. His potassium, on arrival  
at the HSC, I can tell you was 3.9. My understanding  
is that that is fairly normal. Is that correct?

THE COMMISSIONER: I have forgotten  
now. Was this not the one that Dr. Kauffman  
administered something to --

MR. SHINEHOFT: He administered  
something, Mr. Commissioner, to reduce the amount of  
potassium.

THE COMMISSIONER: What was it,  
though? Did he not administer something? What  
drug did he administer?

MR. SHINEHOFT: He gave him an  
enema and he gave him a glucose solution, and there  
was one other thing that he did that I can't recall.

THE WITNESS: Did he give him  
insulin?

MR. SHINEHOFT: Q. He may have  
given him insulin. There were three things that he  
did. He gave the baby an enema, gave him glucose  
and may very well have given him insulin as well.

THE COMMISSIONER: This is purely  
academic but if potassium has the opposite effect of







G7

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

digoxin, if there is digoxin toxicity, I take it  
no one ever administers potassium to correct that?

THE WITNESS: No, definitely. That  
was used for the treatment of digitalis intoxication  
and, in adults, it still can be used. We sometimes  
might try to correct this imbalance in infants as well.

THE COMMISSIONER: I take it this  
does not happen very often that they do that? The  
general cure for digoxin intoxication is to hold the  
digoxin, I take it. What about the child taking  
a dose by accident? Do they ever give potassium for  
that?

THE WITNESS: Potassium has been  
given, certainly, in the treatment of acute  
intoxication, propranolol is used; a variety of  
compounds.

But, to get back to your question --

MR. SHINEHOFT: Q. Just to follow  
up on that, just one question arising out of that.

My understanding, doctor, is that  
where there is a high digoxin level in the body, the  
body produces potassium to try and combat that  
digoxin; is that not correct, doctor?

A. It comes as news to me. I'm  
sorry, I don't mean to be facetious.





G8

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. Well, some people think that. Are you not aware of any literature that would be supportive of that proposition?

A. Let me put it this way: The proposition you are putting before me is supported by effects of digitalis/digoxin on the pump system on a shift in intercellular potassium, I do not think there is any question about that. That is to say that it does do what you have described. What you have described to me is not inaccurate; it is correct.

The point I am raising is: Does the digitalis effect on intercellular potassium allow us to interpret this increase observed in this patient as being attributable to that effect?

I would take the position that that is one explanation. My own view is, I don't think it is sufficient in this patient, particularly this patient with normal renal function, where extra potassium presented to the kidney would be cleared. This is essentially a pretty healthy kid in some ways.

Q. I understand that.

A. So, I would have anticipated if the digoxin was allowing extra potassium to come out of the cells and into the circulation, a lot of it





G9

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

would have been cleared. One could go further and say, well, a very, very large amount had come out of the cells as a consequence of the digoxin action and could not be cleared. I would say, well, the amounts coming out, I don't believe were that large to explain it.

Q. So, you say that is a possibility, although there are other possibilities?

A. I would leave that open.

Q. One of the other possibilities you suggest might be that he received potassium, although you would agree with me that the probability of receiving potassium in error is less likely than digoxin because of its lesser frequency of being administered?

A. I would agree with that, yes.

Q. Do you have any other possible explanations as to the elevated potassium level in this child?

A. Unless the sample - perhaps you could give me this information - was hemolyzed -- I assume it was a normal sample.

Q. No, it was not. There was a hemolyzed sample that was 11.9, I believe, or 11.7, and then there was, almost immediately after that,







G10

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

another sample that was drawn, and that was a non-hemolyzed sample.

I could refer you to the chart, doctor. It is Exhibit 106.

Perhaps, Mr. Registrar, you could...

THE COMMISSIONER: I have it at 9, at page 83.

MR. SHINEHOFT: 9.0.

THE COMMISSIONER: And the non-hemolyzed one was 7.7.

MR. SHINEHOFT: That is correct.

Q. If you turn to page 83, doctor, of the medical chart - have you got that page?

A. Yes, I am with you.

Q. You will see, about halfway down the page, the potassium readings.

Have you found that?

A. Yes.

Q. If you go across, you will see 3.9 is the first reading.

A. Right.

Q. And then it is 9.0.

A. Yes.

Q. And it says above that, "see C". Do you see that, doctor?





G11

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. Yes, I am with you. "Slightly hemolyzed."

Q. It says "slightly hemolyzed" and, then, to the right of that, there is a third sample, 7.7, and do you see above it, it says "see D"?

A. Yes.

Q. What does that say, doctor?

A. "Not hemolyzed".

Q. So, would it be fair to exclude that possibility then?

A. I have accepted what you said.

Q. Are there any other possibilities for the high potassium levels that this baby exhibited?

A. None that really seem logical for the time being.

This patient was on a diuretic that might have led to some potassium accumulation but I don't think that is really an important consideration, frankly.

Q. Just to summarize it, you are saying it could be the digoxin or it could have been potassium that was administered in error to this child?

A. I think I would have to just conclude that, yes. Those are the two major





G12

1

2

possibilities.

3

4

MR. SHINEHOFT: Thank you very much,  
doctor. Those are all the questions I have.

5

6

THE COMMISSIONER: I think we will  
take 20 minutes now, but if you need longer, Dr.  
Mirkin, will you let us know.

7

8

THE WITNESS: Thank you.

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

--- recess.







1

2

---Upon resuming.

3

THE COMMISSIONER: Yes, Mr. Olah.

4

MR. OLAH: Thank you, Mr. Commissioner.

5

CROSS-EXAMINATION BY MR. OLAH:

6

Q. Doctor, I am much obliged

7

to you for reading the passages I referred you to,

8

they were passages for your reference, Mr. Commissioner,  
of my cross-examination of Dr. Hastreiter.

9

Doctor, are you in agreement with the

10

evidence that was offered previously that the first ef-

11

fects of digoxin after an intravenous

12

administration of a lethal dose, let's talk about

13

something in the order of an adult vial, will be seen

14

somewhere after, in the range of 5 to 30 minutes?

15

A. I think that is correct, I

16

would accept that.

17

Q. And that if there was an

18

oral administration of that magnitude that the first

19

symptoms or evidence of digoxin toxicity would be

seen somewhere in the range of the two hours?

20

A. Yes, I think two hours is

21

reasonable. One might reduce it perhaps to an hour,

22

or an hour and a half, let's say two hours is

23

acceptable. You want to be how tight?

24

Q. I would like to actually have

25





1

2

the outside parameter, that is, the longest period  
of time that it would take for the symptoms to first  
appear, to first manifest themselves.

4

5

A. I think most people would  
say between 1-1/2 to 2 hours.

6

7

8

9

10

Q. Thank you. Now, also,  
if I may turn you to the chart of Kevin Pacsai which  
is Exhibit 106, and if I can ask you to turn to page  
65 of that exhibit, Doctor. Could we also have the  
Inwood chart, Mr. Registrar?

11

12

A. Is that page 65 of the Pacsai  
chart?

13

14

15

Q. Yes. If I can draw you  
to the entry from between 3:45 and 6 a.m. of March  
12th, 1981, in particular, and the entry related to  
4:00 in the morning:

16

17

18

19

20

"Nutrition; at approximately 4 a.m.  
attempted to feed baby and his  
behavior was entirely different from  
other times. He was lethargic and  
limp in my arms."

21

22

Would you agree with me, Doctor, that that would be  
the best possible evidence of digoxin toxicity, if  
there was a lethal dose administered in this case?

23

24

25

A. I take it the poor feeding,





1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

this is a general description?

Q. Yes. You see, the apex was found to be very irregular.

A. Okay.

Now, going on with the rest of that description, I think that is very compatible with intoxication, clinical presentation of it, yes.

Q. So when Doctor, we talked about, at the inception we talked about one adult vial, if you were to take a multiple vial situation would the time frame for manifestation of the symptoms accelerate?

A. I'm not sure I understand your question. Does that mean if --

Q. Let me posit it this way. If you had a multiple vial administration would the symptoms appear earlier than they would with the one vial situation?

A. By multiple vial you mean the contents of -- that is a large amount of drug.

Q. A large amount of drug.

A. Okay, correct. Yes, I think that one would expect that the onset of symptoms would be hastened.

Q. That is they would demonstrate







1

2

themselves earlier than they would with a smaller  
dose?

3

4

A. Yes.

5

6

7

8

9

Q. And so that going back there,  
the first evidence, possible evidence of digoxin  
toxicity, would you agree with me, Doctor, that the  
earliest that a lethal dose of any one vial could  
have been administered to this child would have  
occurred at approximately 2 a.m. in the morning?

10

11

A. Now, that presumes of course,  
oral route.

12

13

Q. That is either oral or  
intravenous.

14

15

A. Well I think we probably  
should lump both the oral and intravenous together.

16

17

18

THE COMMISSIONER: The earliest,  
I think, would have to be 2:00, isn't that right,  
because the earliest for the IV, I think is somewhere  
close to 3:30; and the earliest of the IV --

19

THE WITNESS: The oral.

20

21

THE COMMISSIONER: Of the oral, I  
am sorry, will be 2:00, so the earliest I think would  
be 2:00.

22

23

THE WITNESS: Okay, that question,  
now I see it, it is satisfactory, I understand it.

24

25





1

2

Q. All right.

3

A. So I think then I would agree  
going back roughly two hours, or to an hour and a  
half from 3:45.

5

6

Q. To 4:00.

7

A. Oh, from 4:00, or 3:45?

8

Q. 4:00.

9

A. I have in here 0345.

10

Q. "Approximately 0400 attempted  
to feed babe and his behavior was  
entirely different..."

11

12

A. Okay. That is the time you are  
using?

13

14

Q. Yes.

15

A. You go back to 2:00, you  
are suggesting?

16

17

Q. I'm suggesting the earliest  
possible time at which the lethal dose of digoxin  
could have been administered on this child.

18

19

A. I think that is an acceptable  
interpretation, yes.

20

21

Q. So that if my client had left  
the hospital at 7:30 the evening before it is very  
clear that she could not have had any direct involve-  
ment in the death of this child in terms of digoxin

22

23

24

25





1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

toxicity?

A. I would accept that.

Q. Let's then move on to the Inwood chart which is Exhibit 113. If you can assist me by turning to page 63 of that chart, Doctor. If you have a look at that notation, Doctor, you will see that at 0200:

"Babe was feeding poorly all night, fed by NG tube."

Would that be a nasal gastric tube?

A. I presume it would be.

Q. All right. Apex 152 to 119 and respirations down and then lasix was given; and you will see further down 0200 monitor strip showed abnormalities, team leader notified. Then at 2:30 a code 25 is called for resuscitation.

Would you agree with me, Doctor, that if there was digoxin toxicity in this case that the symptoms first seem to have manifested themselves at 2:00 in the morning?

A. That seems to be so.

THE COMMISSIONER: Well, I'm sorry, I disagree:

"Was feeding poorly all night..."

Does that not mean that the child, the first symptoms







1  
2 could have been earlier?

3 MR. OLAH: Well, sir, I guess maybe  
4 we should focus on the apex dropping, respiration  
5 dropping and the abnormalities being shown on the  
6 monitor strip which is the --

7 THE COMMISSIONER: Well, maybe you  
8 are right, certainly I want the expert to give the  
9 evidence, not me. Feeding poorly all night, poor  
10 feeding would conceivably be, could that not be a  
11 symptom of digoxin intoxication?

12 THE WITNESS: Yes, it could be --

13 THE COMMISSIONER: A symptom of  
14 something quite different.

15 THE WITNESS: Of heart failure and of  
16 the disease process itself. So it is a pretty soft  
17 sign and I am not prepared to accept that as the basis  
18 of digitalis intoxication alone. I think though that  
19 at this point this is the first evidence that we have  
20 of an arrhythmia, at least as noted on the monitor  
21 strip, is that correct?

22 Q. That would seem to be the  
23 case, Doctor, if you could turn back to page 62.

24 A. Yes.

25 Q. You will see that an entry  
for 12.3.81, cardiac apex 122 to 155 regular; respiration





1  
2 98 to 58; his blood pressure; his nutrition, will  
3 not drink -- I'm sorry, nutrition, will not drink from  
4 bottle, that is what it says, but it seems to be that  
5 there is a continuing problem with feeding but the vital  
6 signs seem to be stable early in the day.

7 A. Yes.

8 Q. So that the first time we have  
9 any arrhythmias being demonstrated are at 2:00 in the  
10 morning and there seems to be some concern because  
11 the team leader is notified and the resident is called  
12 at 2:00 in the morning, and we have got the dropping  
13 of the apex and the respirations.

14 A. Well, you are not going to  
15 use a decrease of respiration as a sign of digitalis  
16 intoxication, or are you?

17 Q. Well, I don't know, I don't  
18 know if we have to get into the individual signs.  
19 What I want to know, Doctor is, do you see any evidence  
20 of digitalis toxicity prior to 2:00 in the morning of  
21 March 13th?

22 THE COMMISSIONER: Again that could  
23 be digoxin intoxication, is that what you mean?  
24 I'm sorry, you said do you see any evidence of digoxin  
25 intoxication.

MR. OLAH: I would like the question to





1  
2 be anything that could be, anything that could be  
3 sure.

4 THE COMMISSIONER: Yes, all right.

5 A. I think that we have to  
6 conclude that this dramatic change occurred on the  
7 13th.

8 MR. BROWN: Just on this point, Mr.  
9 Commissioner, page 89 of the medical record which I  
10 believe is page 8 of the flow sheet indicates the  
11 pulses. Now, I have photocopied it and I don't  
12 know what the times are in the left hand margin, but  
13 there are a number of notations there as to the  
14 pulses at various times.

15 THE WITNESS: Yes. Well, they do, if  
16 one looks at this they do look fairly stable up until  
17 the end, aren't they, they go from 128, mostly in the  
18 range of 130 or so, some 150. I wouldn't have  
19 interpreted from the heart rate at least that this  
20 patient was experiencing evidence compatible with  
21 intoxication until the events, the terminal or the  
22 events on the 13th.

23 THE COMMISSIONER: Is that at 2:00  
24 in the morning?

25 THE WITNESS: Yes. If you look at  
page 62 we see it says:







1

2

"Code 25 called."

3

The third entry down, do you see that on page 62,

4

it says: "Number 25 call."

5

Q. Two-thirds of the way down?

6

A. Two-thirds, yes, the date  
is unclear, is that also --

7

8

Q. That is the entry by the  
Fellow on call, Dr. Mounstephen who responded to  
the code 25 that we see noted on page 63.

10

All right, that is the  
arrest.

11

12

A. Okay.

13

14

Q. You will see that at 0230  
hours that is 2:30 in the morning the code 25 was  
called and that is Dr. Mounstephen's note as to the--

15

16

THE COMMISSIONER: Yes, but I think  
the date is what he is having trouble with, that  
is -- that has to be the 12th, does it not?

17

18

MR. OLAH: If she died on the morning  
of the 13th.

19

20

THE COMMISSIONER: Following the date  
of death is given in Dr. Mirkin's report as the 12th,  
you say it is the 13th, is it?

21

22

MR. OLAH: Yes, the early hours of  
the 13th.

23

24

25





1  
2 THE WITNESS: I have 13 in my  
3 report here as the date of death.

4 THE COMMISSIONER: Oh, I am looking  
5 at the wrong chart.

6 THE WITNESS: I think I would have  
7 to agree with what counsel is suggesting, that the  
8 primary evidence we have is that this child showed  
9 evidence of digitalis intoxication on the 13th at  
10 the time 0200 and it is also reassuring to know that  
11 the monitor strip showed some abnormalities.

12 THE COMMISSIONER: Isn't that what  
13 Ms. McIntyre was asking about whether a nurse could  
14 determine from that --

15 THE WITNESS: I think someone brought  
16 this up earlier in the morning, I think so.

17 THE COMMISSIONER: That is a similar ques-  
18 tion that you were asked, whether a nurse could  
19 determine from the monitor the irregularity of the  
20 heart which might indicate digoxin intoxication.

21 THE WITNESS: I think it may,  
22 apparently in this particular case they did.

23 THE COMMISSIONER: I'm sorry, I didn't  
24 know who it was, I think Mr. Knazan asked that, he  
25 did ask with respect to a nursing assistant, does  
that make any difference to you, a nursing assistant





1

2

or a nurse being able to do it?

3

THE WITNESS: No.

4

THE COMMISSIONER: In your hospital  
do you have that class distinction?

5

6

THE WITNESS: Well, we have class  
distinctions in our society, I think they also extend  
into the profession.

7

8

9

THE COMMISSIONER: There are judges,  
for instance, of high standing and there are  
commissioners of low standing.

10

11

MR. OLAH: You should know that this  
commissioner happens to be a judge of the Court of  
Appeal, which is a high standing.

12

13

THE COMMISSIONER: Was.

14

15

MR. OLAH: On temporary leave of  
absence.

16

17

18

19

20

21

22

23

24

25

Q. Going back to my question,  
Doctor, it is your opinion that if there is digoxin  
toxicity involved in the death of this child that  
the first evidence or symptoms of such toxicity  
manifested themselves at 2:00 in the morning.







BmB.jc  
I.1

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. Yes, I think we can accept that conclusion.

Q. All right. So, going back to the same question I put to you with respect to the Pacsai child, would you agree with me, Doctor, that the very earliest that a lethal dose of digoxin could have been administered to this child would have been, taking back the two hours, would have been midnight of March 12, 1981?

A. Correct.

Q. And again if my client were off at 7:30 the evening previously, that is, the evening of March 12, she could have had no direct involvement assuming hypothetically that it is dig. toxicity with the death of this child?

A. I would agree with that conclusion.

Q. Thank you. Now, I would like to then turn to the Hines child. That is Exhibit 103, Mr. Registrar. I am going to ask you, Doctor, to turn to page 68 of that chart.

Now, Doctor, again I would like to work on the assumption that digoxin was the cause of death of this child. Assuming that hypothetical, I would like to determine with you when the first





I.2

1  
2 evidence or symptoms of digoxin toxicity could have  
3 manifested themselves prior to the death of this  
4 child.

5 At page 68 we have an entry with  
6 respect to the long night during which the child died.  
7 You will see that with respect to the cardiac status,  
8 about half way down page 68, apex taken, what is it,  
9 every hour?

10 A. Yes.

11 Q. And 160 to 124 and regular. At  
12 4 o'clock apex up at 182 but was regular and the  
13 child seems to have been feeding well. And then if  
14 we drop down further down the page, slept between  
15 feedings with no distress. Then we have an entry at  
16 4 o'clock, apex 182 regular, respiration 54, no  
17 distress, arrested at 4:10.

18 A. Yes.

19 Q. Would that suggest to you,  
20 working on the hypothesis I put to you, that the first  
21 manifestation of digoxin toxicity would have occurred  
22 at about 4:10 of that morning?

23 A. Well, I think we may want to  
24 modify that a little bit. If you look at the second  
25 entry here under that notation, at 300 the baby  
vomited. Now, again, if one wants to use emesis as





I.3

1

2

3

4

5

6

7

(2)

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

an index we might suggest that perhaps that was an early sign at 0300 rather than 0400 but I will just put that into the record that that is a possibility so that if we are going back again two hours it might be at 0100 rather than at 0200 at the very, very earliest perhaps.

Q. All right. So, to err on the side of caution in this case you say that the earliest time at which a lethal dose of digoxin could have been administered in this case would have been 1 o'clock in the morning?

A. About that.

Q. And again if my client were off at 7:30 in the evening, the evening previously, she could have had no direct involvement in any such digoxin-related death working on that assumption?

A. Correct.

Q. Thank you. I would like to take you then just very quickly through the Lombardo child. That is Exhibit 78, Mr. Registrar. I am going to ask you to turn to page 41 of that record, Doctor.

Mr. Registrar, the next exhibit will be the Belanger charts.

Again, Doctor, I would like to work







I.4

1

2

on the same hypothesis, namely, let us assume for the purposes of our discussion that digoxin was indeed the cause of death in this case. I would like to establish when in your opinion the first evidence of digoxin, possible digoxin toxicity occurred in this child.

3

4

5

6

7

THE COMMISSIONER: Lombardo, what page did you say?

8

9

MR. OLAH: It is page 41, Mr. Commissioner.

10

11

12

13

14

15

16

17

Q If you go down to the bottom of the page, Doctor, maybe I can decipher the chart for you. It is an entry between 1900 hours and 0330 hours in the morning. Patient relatively stable. Heparin infusing well, patient feeding eagerly, 1-1/2 to 2 ounces - I guess that would be every three hours - apex 144 to 152 and regular, respiration 150 to 50 shallow but in no distress.

18

MR. LAMEK: It is 50 to 52.

19

MR. OLAH: Is it 50 to 52?

20

MR. LAMEK: Yes.

21

MR. OLAH: My apologies.

22

23

24

25

Q 50 to 52. Colour pink in room air, dusky when upset, became restless after second feed, however, settled well. Then there is an entry





I.5

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

next at 3:30 in the morning. Baby became restless, breathing very shallow, apex irregular and bradycardia, placed on cardiac monitor. Turning over to the next page, colour became more dusky and then oxygen 100 per cent given and then there is an entry about vomiting a small amount of mucus and then a Code 25 is called.

Doctor, what is your opinion as to when the first evidence of possible digoxin toxicity is demonstrated in this case?

A. I think the only written observation is at 0330 and whether it occurred between 1900 and 0330 is difficult to say but I am assuming that had anything occurred in that interval it would have been recorded.

Q. That is the practice at the Hospital as we understand it?

A. Yes. So, I think we have to accept the 3:30 a.m. report as a time at which we are seeing some problems and let's say we would work from that time frame.

Q. And again we apply the two-hour time frame we discussed earlier?

A. Correct.

Q. All right. If I can then move





I.6

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

to the last child I would like to discuss with you in terms of time, and that is the Belanger child, and I would like you to turn to page 64, Doctor, of the medical chart. I would like to direct your attention to the top of page 64. You will see that is an entry between 1 o'clock in the afternoon and 7 o'clock in the evening. Stable during the afternoon, apex 134 to 170 and regular and he is tube-fed, suctioned for moderate amount of white mucus, colour remained pink and there is an entry at 6:30 in the evening that apex was noted to be regular, colour somewhat dusky, respiration up to 80 and very shallow, detube feeding and progress, suctioned orally for moderate amount of white mucus, colour extremely poor, doctor notified and present, apex dropped and cardiac arrest called.

Doctor, what is your opinion as to, assuming that digoxin played a role in this child's death, the first evidence or manifestation of possible digoxin toxicity?

A. It looks like it is at about 1830 when that occurred.

Q. And again to determine the earliest possible time for administration of a lethal dose of digoxin, assuming digoxin played a role in







I.7

1

2

this death, we take your two-hour time interval?

3

A. That is correct.

4

Q. Thank you. Doctor, I would

5

like to then turn you to the child Laura Woodcock if

6

I may.

7

THE COMMISSIONER: I don't think you

8

need to bother too much about Woodcock, your client

9

was not employed at the time, was she?

10

MR. OLAH: Pardon me?

11

THE COMMISSIONER: I am sorry, I

shouldn't anticipate.

12

MR. OLAH: That's the point,

13

precisely.

14

THE COMMISSIONER: Well, I know that.

15

If you wanted to make sure that the doctor knows that  
too, that's fine.

16

MR. OLAH: Oh, no, no, I wanted to

17

ask about the condition of the child. It is in my

18

interest to determine the level of probability because

19

if ---

20

THE COMMISSIONER: I don't want to

21

argue, just go right ahead.

22

MR. OLAH: I will just be very brief.

23

THE COMMISSIONER: Okay.

24

MR. OLAH: Q. Doctor, would you agree

25





I.8

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

with me that the severity of the cardiac lesion with respect to this child is probably one of the lowest of the 36 that you reviewed?

A. Yes, I think so.

Q. And that if you were to put Laura Woodcock on some sort of a range, as Mr. Lamek has done in terms of severity of cardiac status, where would you rate her on a scale of 1 to 10; 1 being the least severe, 10 being the most severe?

A. Oh, probably close to 1, 1.5, low down.

Q. And if you were to take into account her jaundice and her poor feeding and rate her in terms of danger, a life threatening situation, where would you rate her on a range of 0 to 10?

A. I guess one of the problems in assigning that rating now was the difficulty in knowing just what the cause of the jaundice actually was. If for example the jaundice was attributable to intrahepatic biliary atresia as an example, that means they would have to come up to Minnesota and get a liver transplant, the odds of survival would be relatively low.

So, if you asked me based on the jaundice I would have to really determine what was the





I.9

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

cause of the jaundice, was it infectious hepatitis, was it some fundamental anatomical problem in the patient? I don't know what the diagnosis on that actually was. We have jaundice severe with a questionable etiology. I raise that more to attempt to indicate that the mere presence of jaundice or the presence of jaundice is not necessarily a trivial or not life threatening problem. That is the only reason I bring it up.

Q I understand that, Doctor. Did you have a chance to look at the final autopsy report relating to this child?

A I have here three items. I can recite them to you. One, it says expected cholestasis, that is a jaundiced child. I didn't see a histological analysis of the liver, perhaps we missed it. The second post mortem finding was bilateral pneumonia, the third, there was some degeneration of an area in the brain. I don't have Woodcock's chart here but I am reciting from our summary of the chart. Is there a pathologist's report on that?

Q Yes. Exhibit 117, please, Mr. Registrar.

A If the pathologist's report







I.10

1

2

indicates a relatively benign cause for the jaundice  
then I would be able to assign a low number to that.

3

4

Q. If you look at page 30,

5

Doctor, and I'm not sure I can tell you whether it  
is a benign cause or not and maybe you can help us.  
If you'll have a look at paragraph 4.

6

7

A. I see it. Cholestasis, that

8

is the accumulation of bile with severe enlargement  
of the liver and plugging of bile. It doesn't say

9

10

anything about the etiology, nor does it say anything  
about the histological findings on that.

11

12

Q. The only additional information

we have is at page 33.

13

14

A. Yes, I am looking at that

right now, thank you.

15

16

Q. And the biliary tree appears

to have been patent.

17

A. Was what, patent?

18

Q. Yes.

19

A. Good, okay. I think what one

20

could conclude from the findings on page 33, is that  
there was no anatomical anomaly in the liver in that

21

this baby had jaundice of an unknown cause and I think

22

I would conclude this is a baby at sort of real modest

23

risk of death in this acute form at this stage in

24

his life.

25





I.11

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. All right. So, going back  
to the scale, taking the total clinical picture,  
where would you rate her in terms of jeopardy of  
death as a result of her clinical status?





Mirkin  
cr. ex. (Olah)

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

A. I think about two, on the low side.

Q. Doctor, did you have a chance to review this chart at all as to the progress of the child while she was in the hospital?

A. Only in the sense that we reviewed this patient during our team meeting, and I have a summary of her chart in front of me.

Q. Would you agree with me that until June 30th, 1980, her course in the hospital was fairly uneventful?

A. Yes, I think that is acceptable. There was, though, a notation I have, and you can check this, on June 26th she was having some feeding problems. She had rapid respiration and of course she had this enlarged liver and she had an elevated bilirubin. Overall, I think we had the impression that there was nothing that would be considered life threatening in the history of this patient up until June 30th.

Q. Would you agree with me, Doctor, that in fact there was a dramatic change in her condition on June 30th of that year?

A. I think I would agree.

Q. And certainly I believe that







1

2

was something that was unexpected, in your opinion.

3

4

A. Yes, I think these events were unexpected.

5

6

Q. Because she is one of the children whose death you have noted as being unanticipated.

7

8

A. That is correct.

9  
10

Q. I think you indicated that your index of suspicion with respect to digoxin playing a possible role was seven out of ten?

11

12

A. That is not Laura Woodcock, is it?

13

THE COMMISSIONER: I think so.

14

15

MR. OLAH: I would be glad to read your evidence in that regard, two days ago, if you like, Doctor, if it will assist you. At page 8965:

16

17

"I would kind of put this up about on my scale seven out of ten."

18

19

A. Was that based on the subsequent information that we received about here?

20

21

Q. Let me take you back to the question that Mr. Lamek put to you.

22

23

A. Please.

24

25

THE COMMISSIONER: What is that page number again?





1

2

MR. OLAH: Page 8965, volume 87.

3

4

5

6

Q. Perhaps we should start at page 8964 where you reviewed the child's medical condition and then turning to the top of page 8965 you said this:

7

8

9

10

"We concluded that we could not find any obvious cause for the very rapid progression of this patient's problem and concluded that this was an unexpected death."

11

Then the question arose from that:

12

13

14

15

16

17

"Q. An expression that we have heard from time to time in the course of these proceedings, Dr. Mirkin, is 'index of suspicion.'

18

19

Could you give us some indication of the index of suspicion that you have with respect to this child?

20

21

22

23

24

25

A. I would kind of put this up above, in my scale, 7 out of the 10."

A. I think this is one of the patients where I modified our original scoring based on the discussions the other day. Yes, okay, that is perfectly correct.

Q. How does that relate, Doctor,





1

2

in terms of your index of suspicion with respect  
to the children, Cook, Miller and Pacsai?

3

4

You remember that these three children were your  
category one type death.

5

6

A. Those were children who we  
found relative -- we had toxicologic evidence  
to determine the presence of digoxin. Is that  
correct?

7

8

9

Q. That is correct, Doctor.  
You term them as probable.

10

11

A. What is it that you are asking  
me?

12

13

Q. I guess what I am trying to  
determine is whether you feel that Laura Woodcock  
now falls into that category of death or whether  
she falls somewhere below that category.

14

15

16

A. We have no confirmation --  
no toxicologic calculation in Laura Woodcock.

17

18

Q. Actually, there is some  
minimal toxicology and maybe I should direct you to --

19

20

THE COMMISSIONER: You can do it,  
if you like but I think he has given his evidence  
several times that he cannot rely on that. She had  
been receiving digoxin.

21

22

23

MR. OLAH: At the referring hospital.

24

25







1  
2 THE COMMISSIONER: Yes. And this  
3 was exhumation ---

4 MR. OLAH: Yes, sir, and there was  
5 very minimal toxicological data which was probably  
6 neutral.

7 THE COMMISSIONER: Well, you can refer it  
8 to him, if you like, but I know what the answer is  
9 going to be, that he cannot rely on that for  
10 confirmation of --

11 MR. OLAH: I realize that. I think  
12 in all fairness he should have all of the evidence --

13 THE COMMISSIONER: All right, I  
14 should learn, I should be quiet and I am going to be  
15 quiet, I promise you. Carry on. Sometimes even the  
16 old never learn.

17 MR. OLAH: I think what it is is  
18 your ample and best experience in the courts and  
19 young counsel sometimes --

20 THE COMMISSIONER: Carry on. Put  
21 the question.

22 Q. Doctor, I should put something  
23 to you that you may not be aware of. Could I have  
24 Exhibit 95-E, please, Mr. Registrar? I would like  
25 to refer you to page 5 of Exhibit 95-E. You will  
see that sample T103 is a sample from the exhumed





1  
2 autopsy of Laura Woodcock and it is a sample of tissue  
3 in a jar marked muscle and there was a trace of a  
4 digoxin like substance, 4 nanograms per gram,  
5 calculated digoxin indicated. Have you ever seen  
6 this report before, Doctor?

7 A. I have been told it was sent  
8 to me. I have an earlier one and I think that data  
9 was contained in it. Yes, I am sure it was.

10 Q. The other piece of informa-  
11 tion that you should be aware of was that while this  
12 child does not appear to have received digoxin at the  
13 Hospital for Sick Children, that she was digitalized  
14 at the referring hospital. Are you aware of that,  
15 Doctor?

16 A. I am not sure that that  
17 was in our notes. I can check that out in a moment.  
18 We have no record that digoxin was given. Was that in  
19 the patient's file?

20 THE COMMISSIONER: I think there was  
21 a record that she had digoxin at the referring  
22 hospital.

23 Q. If I can turn you to page  
24 38 of the hospital chart, Doctor, you will see about  
25 two-thirds of the way down the page:

"Seen in Oshawa. Large heart on





1

2

X-ray, digitalized, some improvement."

3

A. Okay.

4

Q. You will see underneath

5

that:

6

"Last night heart rate 40, dig.  
discontinued."

7

8

A. Okay. I think that may not  
have been picked up by the reviewer. We have in our  
interpretation assumed this patient received no  
digitalis in the Children's Hospital, I think that  
is correct.

10

11

12

Q. That is correct. Now, does  
the minimal data that you have got in terms of  
forensic data, does that have any impact upon your  
opinion whatsoever?

13

14

15

A. No, I don't think that is  
much help to me.

16

17

Q. So then, just going back to  
the question that I was trying to deal --

18

19

A. Could I qualify that a bit?

20

Q. Yes, please do.

21

A. This was exhumed data taken  
how long after --

22

23

Q. A minimum of 18 months,  
Doctor.

24

25







1

2

A. That is very difficult to interpret. I think I would probably just let it be.

4

Q. Going back to the question that I posed to you earlier, where would you rank Laura Woodcock in terms of the category 1 children, namely, Cook, Miller and Pacsai?

7

8

9

10

11

12

A. I think they have to be ranked with lesser certainty because of the lack of toxicologic data, and my change in the rating here, as I look upon this very acute course of events that occurred in this patient, in our original scoring we had a zero. You can see that.

13

Q. Yes.

14

15

16

17

18

19

20

A. I think this change to seven was based on my review here. I think it is a scenario very compatible with dig. intoxication as well and we just did not have any electrocardiographic data to confirm the view; we had not toxicological data. We eliminated the possibility that this patient could be dig. intoxicated because by record she had not been given any digitalis.

21

22

23

24

25

If one eliminates the last possibility, let us say, and examines the actual findings in this patient, I think it becomes apparent that the clinical presentation here between the hours





1

2

of 3:00 to 9:30 at night are very compatible with  
dig. intoxication. I would put them at a lesser  
order of certainty than the first three because of  
the absence of toxicological proof. That is the  
basis for that designation.

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

41

42

43

44

45

Q. But it is still in your view  
a fairly high probability that digoxin played a rôle  
in this child's death?

A. Yes, I think that the ranking  
of 7 that I reassigned to it would suggest that.

Q. A final question before I  
sit down, Doctor, relates to the child David Taylor  
and you will recall that when you were examined by  
Mr. Lamek your opinion at page 8843 was that there was  
a clear connection between digoxin and the child's  
death. The question I want to put to you, Doctor,  
was, applying Mr. Lamek's index of suspicion, where  
would you put David Taylor?

A. I think we thought that  
David Taylor had a very high likelihood of digitalis  
intoxication and the index of suspicion that Mr. Lamek  
uses for what, now?

Q. You gave him a rating of 9,  
but what I want to know is in your opinion what  
probability, in terms of the index of suspicion,





1

2

zero to ten--

3

THE COMMISSIONER: And you want to  
go further than that. Do you want to say as the  
cause of death?

5

6

MR. OLAH: Precisely.

6

7

THE COMMISSIONER: As opposed to  
just being toxic during life.

8

9

THE WITNESS: I think that is the  
point and I think I would rate that very high, in the  
order of 9.

10

11

THE COMMISSIONER: That is as the  
cause of death?

12

13

THE WITNESS: As the cause of death,  
yes.

14

15

MR. OLAH: Q. Just out of curiosity,  
Doctor, what would you rate Justin Cook at?

16

17

A. Justin Cook. I would rate  
him a very high also.

18

Q. Would it be a 9 or a 10?

19

A. I really am not able to  
engage in discrimination in that. I think it is very  
important to say a high level of suspicion in my  
mind.

20

21

22

MR. OLAH: Thank you, Doctor. I am  
very grateful for your assistance.

23

24

25







DM.jc  
K

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

THE COMMISSIONER: Mr. Labow?

MR. LABOW: Thank you, Mr. Commissioner.

CROSS-EXAMINATION BY MR. LABOW:

Q. Good morning, Dr. Mirkin, my name is Stephen Labow and we represent six sets of parents whose children died in this matter.

Doctor, I already told you that I would be referring to an article that you co-authored, that you told me you had a copy of and it is called: "Kinetics of Digoxin Absorption and Relation of Serum Levels to Cardiac Arrhythmias in Children".

THE COMMISSIONER: Is this your article, I take it it is?

THE WITNESS: I think I did, I will -- yes, that is mine.

THE COMMISSIONER: I know, but I just want to make sure it is.

THE WITNESS: That is mine, thank you.

THE COMMISSIONER: Exhibit 317.

--- EXHIBIT NO. 317: Article entitled: "Kinetics of Digoxin Absorption and Relation of Serum Levels to Cardiac Arrhythmias in Children".

MR. LABOW: Q. Doctor, this was a study of 15 children with congenital heart defects, my understanding?





K.2

1

2

A. I beg your pardon, I am sorry.

3

Q This was a study of 15 children

4

with congenital heart defects?

5

A. That is correct.

6

Q All of whom were receiving

7

digoxin?

8

A. Yes.

9

Q And I would like to turn to your

10

conclusions and your discussion at page 394. At the  
top of the second column you point out:

11

"Despite a significant increment in

12

the serum digoxin concentration, there

13

appeared to be no evidence of an

14

increased tendency towards electro-

15

cardiographic abnormalities or

16

clinically discernible toxicity ... "

17

My reading of your article seems to

18

indicate that your overall conclusion was that you

19

really couldn't rely upon any relationship between

20

rising serum levels and the appearance of cardiac  
arrhythmias?

21

A. I think that is not an

22

unreasonable conclusion to draw from that. What we

23

really were attempting to get out was the variability

24

in reaching a judgment, the problems in reaching a

25





K.3

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

judgment solely from the level itself, as the predictive value of such information left much to be desired, I think that was the issue.

Q At the very bottom of that column just starting: "The data obtained ...".

A Yes.

Q You discussed the idea that:

"There was no clear relationship ... reliance solely on serum concentrations ...will prove misleading in a very large percentage of cases."

A That was our opinion in 1971.

Q Is that still your opinion?

A I think that in children that --

THE COMMISSIONER: I am sorry, did you say 1971?

MR. LABOW: Q This is dated 1974.

A Oh, 1974, well, okay.

THE COMMISSIONER: 1971 I think was the first, wasn't it, the first digoxin levels taken in 1971, am I wrong, perhaps I am wrong?

THE WITNESS: I think some early articles were done.

THE COMMISSIONER: I thought the first time they were able to take the levels at all was 1971, am I wrong?







K.4

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

THE WITNESS: You mean the radioimmuno-  
assay?

THE COMMISSIONER: Yes.

THE WITNESS: It is probably around that  
time, I think that is correct. Excuse me, I am sorry.

MR. LABOW: Q Now, is it still your  
opinion --

MR. LAMEK: I suspect, Mr. Commissioner,  
that Dr. Mirkin is right, on the first page, page 387,  
it is recorded:

"A preliminary report of this  
investigation was presented to the  
Society for Paediatric Research, April  
24, 1971."  
Indeed the work may have been done at  
that time.

THE WITNESS: God, time flies.

MR. LAMEK: A great memory though.

THE COMMISSIONER: They received it for  
publication July 13th, 1973. So obviously, I guess  
if they received it for publication you are not  
allowed, or are you allowed to amend it after that date?

THE WITNESS: Oh, it was received for  
publication and then we probably made some editorial  
modifications.





K.5

1

2

THE COMMISSIONER: But not any changes  
in substance?

4

THE WITNESS: No, this is the final  
paper.

5

6

MR. LABOW: Q Is this still your  
opinion today, Doctor?

7

A That the --

8

9

Q That reliance on serum  
concentrations will prove misleading in a great  
number of cases?

10

11

A Alone, yes, I think so.

12

13

Q Does that work both ways? In  
other words, is it true that a child could be  
intoxicated with a low concentration and at the same  
time another child may not be intoxicated with a  
relatively high concentration?

14

15

16

17

A It is a difficult question to  
answer, but I think that certainly that is possible.  
You know, one way of looking at it is that if you  
consider that the human being, unlike an inbred  
animal has a normal distribution of response, so that  
there are individuals who respond to low doses and  
some to high. So based on that presumption and that  
actual fact I think in practice, the answer to your  
question must be, yes.

18

19

20

21

22

23

24

25





K.6

1

2

3

4

(2)

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q Now my last comment on this paper is that at the bottom of the column, the last paragraph on page 395 in the left column, you say:

"It is noteworthy that transient, but dramatic increments in serum digoxin levels following acute poisoning in infants may occur with minimal signs of clinical intoxication."

A Yes, we experienced that and the explanation for that still sort of is obscure to me. I think it is important to recognize though that these children had normal hearts I think if my recollection is accurate.

Q The children you studied in this?

A No, these two.

Q These two children?

A These are children that I anotated on page 395, and my recollection is that they somehow became intoxicated by getting into a parents' supply or something of that sort, and they were normal. We found I think - although I don't swear to this, that there have been other reports of acute ingestions, single doses, where the abnormalities produced by these very high concentrations have been minimal and that is still I think a valid observation.







K.7

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q Now would you, or could you go as far, based upon the idea that these children were - had structurally normal hearts, for our situation where most of the children did not have structurally normal hearts, could the same thing happen?

A I guess it could happen but one must be concerned about the varying response or differential response of the sick heart so to speak and the abnormal heart to the drug. It has been suggested I am sure by many of your consultants that the pathological heart may have a different sensitivity to the digoxin than the normal. So I think we have to qualify that and not make it a complete extrapolation from normal to a pathological situation.

THE COMMISSIONER: A different one, generally speaking, would make more sense, wouldn't it? I was leading you there.

THE WITNESS: That's fine. That is difficult to say, there are some situations where a pathological heart does not seem to respond, digoxin does not produce a beneficial result and one could say that the heart is less sensitive. On the other hand there are patients with abnormalities of the heart where you get very toxic events at low doses.





K.8

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

THE COMMISSIONER: There are certainly some, and I would say those are probably the cases of Cook, Lombardo, Hines and Belanger, where a suspicion that they may be too sensitive to digoxin, that digoxin toxicity would be reached apparently with the first dose. Isn't that --

THE WITNESS: Well, I think there are some patients where the pathology would enhance their sensitivity. I think the answer to your question is yes.

MR. LABOW: Q. Now Doctor, do you still have Kristin Inwood's medical chart?

A. I do not.

MR. LABOW: Mr. Registrar, I will be referring to the Gionas child's chart as well.

THE WITNESS: Which one are we doing now?

MR. LABOW: Q. Inwood, No. 32, your code.

Mr. Commissioner, just to clarify one of the problems this morning, it is my understanding with Kristin Inwood that when she entered the Hospital for Sick Children, when she was transferred, digoxin was prescribed but because the electrocardiogram showed some abnormalities it wasn't ordered held but none of the digoxin was administered. On page 87 of the chart you can see in the medication record that







K.9

1

2

there was no digoxin signed off for those first  
doses and then it is ordered held.

3

4

THE COMMISSIONER: Is this a record  
from her admission on; this is a complete record  
from her admission on, is it?

5

6

7

MR. LABOW: The information I just gave  
you I got from Dr. Bain and Dr. Rowe when I -- Dr.  
Bain especially when I asked him because we really  
were not sure why no digoxin was administered at the  
beginning.

8

9

10

11

THE COMMISSIONER: Did she - I am sorry,  
confusion reigns supreme today certainly on Kristin  
Inwood. Was she digitalized in some other hospital?

12

13

14

15

16

17

18

19

MR. LABOW: She was receiving digoxin  
at the other hospital before she was transferred. At  
Volume 18, page 3087, Dr. Rowe testified that Kristin  
Inwood had been on digoxin since the 28th of February  
and she was transferred on the 11th of March and she  
was not supposed to receive any from that time  
forward.

20

21

THE WITNESS: That would agree with my  
notation.

22

23

MR. LABOW: Q. Now, she did receive  
that dose in error.

24

25

THE COMMISSIONER: Is that because a







K.10

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

hold order was given?

MR. LABOW: Excuse me?

THE COMMISSIONER: Was it because --

MR. LABOW: Apparently it was because the electrocardiogram showed signs of toxicity, the electrocardiogram that was taken on admission.

Q. Now, Doctor, you told Ms. McIntyre today that in regard to the serum sample that registered a 491 concentration you wouldn't think that there would be any problems, any major problems with it, but you did comment about boiling. Now, could you tell me what boiling would do to the sample to make that reading unreliable?

A. Well, I am really not sure at what temperature digoxin would break down. But if boiling were of significant duration one could foresee that the structure of the digoxin would break down and perhaps be converted to any molecular material that was not measurable by liquid in the assay systems that are used.





1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

Q. Would that raise the digoxin concentration?

A. That would decrease it.

Q. Okay.

THE COMMISSIONER: You said it would raise it?

THE WITNESS: No, it would decrease it.

THE COMMISSIONER: Oh, it would decrease.

THE WITNESS: Now, I guess I ought to give you -- I am looking to see if I have some information on the stability of digoxin under those conditions, but I do not.

THE COMMISSIONER: Would the boiling not also decrease some of the fluid as well?

THE WITNESS: That's a good point, yes, it would.

THE COMMISSIONER: It wouldn't necessarily decrease. It would break down the digoxin and also evaporate the fluid.

THE WITNESS: Well, an interesting thought has just been raised. If you boiled the material - I am sorry to introduce this. If you boil the material the Commissioner has suggested that perhaps some of the fluid might evaporate off so that





1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

you would have a reduction in concentration actually of the remaining digoxin present. The boiling is a very -- I can't imagine -- pardon me?

MR. LAMEK: I thought you would have increased concentration of what was left.

THE WITNESS: Exactly, increased concentration.

MR. LAMEK: You said reduced.

THE WITNESS: I'm sorry?

MR. LAMEK: You said reduced.

THE WITNESS: Oh, fine, I will correct that. You have an increased concentration of what had not been actually destroyed by the heating process itself. But I can't really honestly visualize the sample being cooked in a laboratory.

Q. Well, I will put it to you that Mr. Cimbura simulated some experiments on heating.

A. Yes.

Q. And found no significant change in the levels of digoxin.

A. Oh, okay.

Q. He has given that evidence before the Commission.

A. Oh, good.

Q. But that didn't include boiling,







1  
2 as far as I knew and I just wanted to know if you had  
3 any background articles that you could refer us to.

4 A. No, I just raise it and I  
5 really would have to check on the stability of  
6 the drug under those conditions and I think that is  
7 easy to do.

8 Q. Okay. Now, you commented  
9 on Kristin Inwood's potassium level of 7.3 and you  
10 did indicate that you had read Dr. Kauffman's  
11 report.

12 A. Yes, I did indicate that.

13 Q. Now, in Dr. Kauffman's  
14 letter of the 16th of December, 1982, and I am not sure  
15 what the exhibit number is, he says that hyperkalemia  
16 in the presence of normal renal function is consistent  
17 with digoxin intoxication.

18 A. Hyperkalèmia?

19 Q. Hyper.

20 A. Well, what did he document  
21 that statement with?

22 Q. He didn't.

23 A. Okay. Now, let me advise  
24 you and the other gentlemen that I have found the  
25 article that we published in the New England  
Journal of Medicine. Since we deal with a realistic





1  
2 data base here, we have no evidence that the plasma  
3 potassium level changes in patients who are receiving  
4 digoxin. This paper is notated to cover patients  
5 who are considered to be toxic, those who are  
6 considered to be non-toxic, etc. I think you can look  
7 at this and see what you've got.

8 MR. SHINEHOFT: Excuse me, Mr.  
9 Commissioner, perhaps the witness would be kind enough  
10 to give us the reference.

11 THE WITNESS: Sure, I will.

12 THE COMMISSIONER: Well, we will get  
13 the document, it will become an exhibit after  
14 a while. Is that all right? You see, we make copies  
15 of it.

16 THE WITNESS: Oh, yes, of course, it  
17 is my only copy.

18 THE COMMISSIONER: Well, we can not  
19 only make copies but we can give you several, the  
20 original plus several copies.

21 THE WITNESS: Thank you. The paper  
22 is in the New England Journal of Medicine, Volume  
23 299, page 501-504, 1978, September 7th edition.  
24 Is that too fast?

25 THE COMMISSIONER: No, it's not too  
fast for the reporter.







1  
2 THE WITNESS: All right. Table 1 is  
3 the table I am referring to.

4 THE COMMISSIONER: Yes.

5 THE WITNESS: Okay. I did take  
6 exception to that conclusion. I think it is kind of  
7 important because what the previous counsel presented  
8 was the fact that digoxin is indeed able to exert  
9 an effect on potassium in the red cell and he is  
10 perfectly correct on that score, it does reduce it.  
11 Now, where does that go. The question is can you  
12 see an elevation in the serum potassium and in our  
13 study we did not and I think it would be very important  
14 to bring in other data where perhaps that is demonstrated  
15 to occur because if we are to postulate that I think  
16 the information, since everyone -- I notice Dr.  
17 Hastreiter quoted that statement, I think saying  
18 there were hundreds of papers in the literature  
19 we ought to get.

20 MR. LABOW: Okay.

21 MR. SHINEHOFT: I think as well, Mr.  
22 Commissioner, Dr. Kauffman indicated that there were  
23 several articles that have been written and I have  
24 written to him for a citation and list of those  
25 articles which I have not yet received but if I do  
I will certainly provide those to Mr. Lamek.







1

2

THE COMMISSIONER: Yes, all right.

3

At any rate, if it is all right with you, Doctor,  
we will make that an exhibit, but not until after  
lunch so that we will have copies available at the  
time.

6

7

MR. LABOW: Q. Now, doctor, staying  
on the topic of the potassium level.

8

A. Yes.

9

10

Q. This potassium level was  
apparently taken at 2:45 on the morning of the 13th.  
Now, in the chemistry report at page 81 of the chart  
it seems to indicate that the sample taken and used  
for that potassium level was at 2:45.

11

12

13

A. 2:45?

14

15

Q. Now, this child arrested at  
2:30.

16

A. Yes.

17

18

Q. And was only pronounced dead  
at 3:00. But we have heard that there was very little  
response to the resuscitation.

19

20

A. Yes.

21

22

23

24

25

Q. Now, it is my understanding  
that potassium rises at death. Could the high level  
be accounted for because the child actually died at  
2:30, notwithstanding when the child was pronounced





1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

dead?

A. I think if the temporal events as you describe them are accepted, I think that one might have seen that. I really do not have any knowledge or experience relating to the rate with which this increment in potassium level might be observed post mortem and perhaps that would be useful information. If you are postulating a 15 minute interval between death and the acquisition of the sample, as I understand you are, is that correct?

Q. Yes.

A. During that 15 minutes we must postulate the potassium would go up. I think it is possible but I do not have any data to confirm that impression.

Q. Thank you. Now, you seemed to indicate this morning, and I am really very unclear, that you were relatively confident that the sample that was tested and produced the 491 level was a sample that you could rely on.

A. Okay.

Q. Is that accurate?

A. This sample was obtained from what site?

Q. Well, my understanding is





1  
2 that it was obtained from the sagittal sinus. That  
3 is my understanding, although Dr. Taylor said he  
4 normally took it from the inferior vena cava.

5 THE COMMISSIONER: What is the  
6 basis of your understanding because it may well be  
7 you are right. Is that in Exhibit 95?

8 MR. LAMEK: It is T 46 in Exhibit  
9 95-C, sir.

10 THE COMMISSIONER: Which, 95-C?

11 MR. LAMEK: 95-C, page 1, sir. But  
12 that is not very informative.

13 THE COMMISSIONER: Blood from  
14 autopsy from sagittal sinus is the note I have here,  
15 but I don't know if that is right. Is that the  
16 same note you have?

17 MR. LABOW: That's the same note  
18 I have, Mr. Commissioner, and I apologize. I am not  
19 sure where I got it.

20 THE COMMISSIONER: None of us know  
21 where we got it. It may be from Dr. Bain's report.  
22 If you look at Dr. Bain's report, which is Exhibit  
23 48.

24 MR. LABOW: O. Dr. Bain testified  
25 that in the report he received from the CDC, not the  
one that we see, but the handwritten report, the







1  
2 handwritten document that he received from the people  
3 from the Center for Disease Control they told him that  
4 the sample was from the sagittal sinus. That's the  
5 note I have.

6 THE COMMISSIONER: Do you have some-  
7 thing?

8 MR. OLAH: Yes, on page 44 of  
9 Dr. Bain's report he said, about half way down the  
10 page:

11 "I think it was said to have been  
12 blood taken at autopsy from the  
13 sagittal sinus."

14 THE COMMISSIONER: Yes. Well, there  
15 we are, all right.

16 THE WITNESS: So, we accept that then  
17 as being blood from the sagittal sinus.

18 Q. Yes.

19 A. Or if we do, what is my data  
20 base. Is there agreement that this is blood from  
21 the sagittal sinus?

22 THE COMMISSIONER: It seems to be the  
23 only evidence we have.

24 MR. LAMEK: Mr. Commissioner, that  
25 is not quite so, with respect, and perhaps Dr.  
Mirkin could deal with the two options. The other





1  
2 candidate, as I recall it, was Dr. Taylor who  
3 conducted the autopsy and who drew the sample,  
4 he had no specific recollection of drawing this one,  
5 he said it was his normal practice to draw blood  
6 for these purposes from the inferior vena cava. So,  
7 perhaps Dr. Mirkin could address both candidates.

8 THE COMMISSIONER: Well, apparently  
9 you have a choice, then, Doctor, inferior vena cava  
10 or the sagittal sinus.

11 THE WITNESS: Okay, let's assume it  
12 is blood, and I think that is pretty good.

13 THE COMMISSIONER: Yes.

14 THE WITNESS: Okay, and I have no  
15 reason to have lack of confidence in that sample, to  
16 the best of my knowledge. It is a post mortem sample  
17 and it is very high and if we were writing the paper  
18 and seeing the patient with that we would assume that  
19 the patient with that concentration in the blood  
20 would very likely manifest some toxic effects.

21 MR. LABOW: Thank you, Doctor.

22 MR. OLAH: I am not sure if there  
23 is any significance to this, but the witness talked  
24 about blood in the sample.

25 THE COMMISSIONER: Serum.

MR. LABOW: Serum.





1

2

THE WITNESS: Thank you, I stand  
corrected, that's a good objection.

4

THE COMMISSIONER: Serum is not whole  
blood but isn't it sometimes referred to as blood?

5

6

THE WITNESS: No.

7

THE COMMISSIONER: It isn't, it is  
quite different. It is a product of blood?

8

THE WITNESS: A component of blood.

9

10

THE COMMISSIONER: Component of  
blood, right.

11

12

13

14

15

16

17

18

MR. LABOW: Q. Now, Doctor, just  
with regard to that and the storage problems, if any,  
you previously testified when you were here in June,  
and this is found in Volume 4, page 588 and 589, that  
serum and/or plasma specimens were usually fairly  
stable and that most of them are collected and kept  
in the cold and assayed subsequently and you don't  
find any problems with these. Is that still your  
evidence?

19

A. I think that is correct.

20

Q. I would like to look at your  
review of Philip Turner.

21

22

23

THE COMMISSIONER: I wonder if this  
would be a good time? Are you going to be very  
short on Turner?

24

25







1

2

MR. LABOW: Very short on Turner.

3

THE COMMISSIONER: All right, well,

4

let's do it.

5

MR. LABOW: This is code number 2, it

6

is found at page 129 of Exhibit 313, Mr. Commissioner.

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25





12jan84  
M  
DPrC

1  
2 I would just like you to turn to  
3 part VIII, which is the fourth page. Could you  
4 explain what the conclusion means:

5 "Only concern is recurrent hypo-  
6 kalemia, which could exacerbate  
7 digitalis toxicity and presence  
8 of pulmonary disease."

9 What does the sign of the arrow -  
10 toxicity in brackets mean?

11 A. That means it tends to  
12 increase the potential effect of the digitalis. As  
13 you are aware, in this particular patient, we had  
14 findings that we felt were not consistent with  
15 digitalis intoxication but were more consistent with  
16 problems relating to the basic disease of the  
17 patient. We had a patient who, again with the  
18 restrictions on interpretation that you already  
19 mentioned, had blood levels that were thought to  
20 be in a normal range. We concluded that this  
21 patient was a low likelihood for digitalis  
22 intoxication.

23 That material on the bottom, the  
24 terminal part, was meant to indicate that, in a  
25 patient who had demonstrable episodes of decrease in  
serum potassium, as you know, this tends to enhance





M2

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

the effects of the digitalis. That is why that was put in. These notes are really guides to give the broadest possible interpretation here. We checked the digitalis intoxication "absent" here. Well, what other extenuating circumstances could have come into play? So, we put in all the information so it was there for the people to interpret as best we could.

With a low potassium, one might have had the enhancement of digitalis effect. The patient who has pulmonary disease tends to develop acidosis; that is pH in blood goes down. That also predisposes to digitalis intoxication. These are factors that we were trying to factor into the whole evaluation.

I think that is the best I can say about that.

MR. LABOW: This would be a good time to break, Mr. Commissioner.

THE COMMISSIONER: Until 2:30 then.  
--- luncheon recess.







12jan84  
AA  
DPrc

--- on resuming.

THE COMMISSIONER: Yes, Mr. Labow.

MR. LABOW: Mr. Commissioner, we  
now have the article that Dr. Mirkin referred to.

THE COMMISSIONER: We will make that  
Exhibit 318.

--- EXHIBIT No. 318: Article entitled, "Relation  
Between Plasma and Red-cell  
Electrolyte Concentrations  
and Digoxin Levels in Children".

MR. LABOW: Q. Doctor, my under-  
standing of the data sheets that you prepared for  
each child was that essentially what the team of  
doctors was looking for was evidence, if you will  
excuse the expression, of digoxin intoxication  
during their stay in hospital.

A. That is correct.

Q. Could you turn to page 49 of  
Phillip Turner's hospital record. It should be right  
beside you.

A. Yes, I am here.

Q. In the middle of that page,  
the top half of that page, the whole note is a note  
by Dr. Soulioti and in the middle of that page  
it says:

"Dig. - episodes of sinus bradycardia





1

2

therefore digoxin not always given."

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

My only question is: Is that not something that might have indicated that there was some question about toxicity or at least toxic effects during the stay in hospital? I do not see that anywhere in No. 2, which is Phillip Turner.

A. I think that, taken at face value, the episode of sinus bradycardia might certainly be associated with digitalis intoxication but I don't understand the second line in that entry, "episodes of sinus bradycardia". Do you think that those are three dots in the second line in front of --

THE COMMISSIONER: I think it is "therefore".

THE WITNESS: I think that is reasonable. "therefore digitalis not always given."

Now, does that mean there were points during the hospitalization at which the dosage was not administered? Is that in the record, by the way?

MR. LABOW: Q. For this child?

A. Yes.

Q. Yes.

A. So, there were moments when the digoxin was held, in a sense?





1

2

Q. Yes.

3

4

A. Here we are. Now I am  
looking at his record.

5

6

7

You are asking me whether that  
would not have indicated that the physician in  
charge was concerned with some adverse effect of  
the digoxin?

8

9

Q. That is correct.

10

11

12

13

A. I think that is reasonable  
to assume.

14

15

16

17

18

19

20

21

22

23

24

25

Q. Is this a child where there  
was some indication of digitalis intoxication during  
the stay in the Hospital?

A. I think the problem that  
we face with this particular patient is whether or  
not that particular incident was of such importance  
or magnitude as to strongly suggest digitalis  
intoxication. It is my feeling that we felt this  
particular patient had a type of disease that might  
have been associated with changes in rhythm. Further-  
more, we also, using the data of the blood levels or  
serum levels, concluded that there was no pharmaco-  
logic or toxicologic reason to think that digitalis  
intoxication was present.

I think that is how we came up with







1  
2 this very low score.

3 It is important to remember that,  
4 at the time that we observed this effect -- this  
5 note you referred me to was written on 7-30; is that  
6 correct?

7 Q. That is correct. The child  
8 died two days later.

9 A. At that time, according to  
10 my records, we had a digitalis level of 0.5.

11 Q. That is correct.

12 A. One of the points that we  
13 made, even though the patient had a very low digoxin  
14 level, the potassium level, it seemed to me, was low  
15 in this patient - only about 2. So, it is conceivable  
16 that despite a low concentration of digitalis, we  
17 might have been seeing an exaggerated effect due to  
18 the low potassium, as one analyzes it completely.  
19 But, overall, while we do raise concerns on the last  
20 page of this review, we concluded on balance that  
21 this patient did not have digitalis intoxication  
22 because of those factors.

23 Now, I think it is fair to hold to  
24 that analysis here. Had we had other changes in  
25 rhythm that I could have isolated from the basic  
disease, we might have come up with a stronger





1

2

inclination to list this as digitalis intoxication.

3

4

Q. I just have one other question  
arising from that.

5

6

If you have a child who has low  
potassium --

7

A. Yes.

8

9

10

11

12

13

14

Q. -- and because of the low  
potassium is predisposed to an exaggerated response  
to digoxin but has a very low digoxin level, serum  
digoxin level, if that child exhibited signs of what  
would otherwise be digoxin intoxication, would you  
still consider the child to be under the effects  
of digoxin intoxication, notwithstanding a very low  
level?

15

16

17

A. I think one would definitely be  
pushed into that direction, yes.

18

19

20

21

I think the answer to your question  
is, yes.

22

23

24

25

Q. Thank you, doctor.

Could you turn to Barbara Gionas,  
which is a Hospital record you should also have  
right beside you.

A. I have that.

Q. Doctor, my questions again arise  
out of things that I see in the chart that you did not





1  
2 make reference to, and I would like you to turn to  
3 page 73 and your Chart Code No. 36.

4 In part III B, you point out under  
5 March 3 to 7: "emesis x2 - (dig. intox.?)"

6 That is in your note?

7 A. Yes, that is right.

8 Q. On pages 73 and 74, there is  
9 a note by Dr. Kobayashi where he reviews a number  
10 of things and then writes: "Impression - digoxin  
toxicity".

11 A. Yes.

12 Q. Based upon what he has  
13 transcribed, did you not agree with his diagnosis?

14 A. Yes, obviously, I did since  
15 we -- my notes here, by the way, are -- the fact that  
16 I put digitalis intoxication into this document  
17 really is not to imply that that was my conclusion at  
that time.

18 Does that follow?

19 Q. Yes. The question mark there.

20 A. Digitalis intoxication  
21 really was taken from the chart, and this is my  
22 notation as to what was reported in the chart.

23 So, the fact that digitalis intoxica-  
24 tion is written down there does not mean it was my  
25







1

2

interpretation at the time.

3

4

Q. So, this is what you took  
out of the chart?

5

6

7

A. Out of the chart, and I think,  
under the circumstances, I would not have found too  
much to argue with. I would have agreed with what  
the physician here infers.

8

9

10

11

Q. When you rated these  
children on a scale regarding exhibiting signs of  
digitalis intoxication during their stay in hospital,  
this child scored a zero.

12

A. I see this.

13

Q. My question is: Why?

14

15

16

17

18

19

A. I think that is a good  
question. One of the reasons I think that we felt  
this was that the only evidence that we had that  
this patient was having any digitalis intoxication  
was the fact that the patient had emesis. That was  
really the only sign. We had no electrocardiographic  
tracings to show arrhythmia.

20

21

22

23

24

25

One of the strongest pieces of  
evidence that we tried to use here - not one of the  
strongest but a strong piece of evidence on this -  
were the electrocardiographic tracings taken,  
particularly if they were obtained at a time when





1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

other symptoms were present. If there is electro-  
cardiographic evidence to suggest that these patients  
were having arrhythmias at that time, I think that  
would be very helpful because I am looking through  
here and I do not see any evidence that we have on  
the EKGs that showed an arrhythmia.

—





DM.jc  
BB

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Q Well, at pages 379-383.

A Okay.

Q There are notes, just notes  
from Dr. Contreras.

Q Let's say:

"ST changes ? digoxin."

A Well, I have those in my review  
also.

Q Dr. Moller has them down under  
rhythm strip in Exhibit 314.

A Right. Now that of course we  
interpreted as so-called digitalis effects. You know,  
I have been trying to analyze this to indicate that  
the digitalis effect is not synonymous with digitalis  
intoxication. We did not see any arrhythmias and I  
have been thinking it over now, and I have the sense  
that the group collectively felt that this was not  
a patient that had sufficiently strong evidence for  
toxicity, at least hard data. I imagine now perhaps,  
in the course of this testimony, that we might have  
upgraded that a little bit, but I still think it is  
not in the category at least of those patients that  
we have seen in the 7 and above range.

Q But it might have got into the  
medium category?







BB.2

1

2

A. Perhaps.

3

Q. Suspicious type?

4

A. Perhaps one might have put it

5

in that category. I think another issue that we were

6

using, and again with the same caveats we have

7

brought up, the blood levels on these patients were

8

considered to be in a relatively normal range, we had

9

6 or 7 measurements, with the exception of the post

10

mortem I guess that was a little elevated, was it not?

11

Q. These were tissue levels.

12

A. Oh, we have no serum post mortem,

I am sorry.

13

Q. No?

14

A. But the serum levels that were

15

taken ante mortem, at least clearly on in this patient's

16

course, well even the ones taken up on 3.7, appeared

17

to be quite low, 1.2. So we put this all together

18

in the absence of the arrhythmias, the low blood level.

19

The only thing we had was that episode of emesis, and

20

I note here that there was some slowing of the heart

21

rate and perhaps one might have given that a little

22

higher number in our scoring system.

23

Q. Now, notwithstanding the article

that we previously discussed where there may not be

24

this correlation between arrhythmias and levels.

25





BB3

1

2

A. Yes.

3

Q. You still, when you discussed it,  
you still rated this a zero and that was my concern.

4

5

A. When we discussed it with the  
team you mean?

6

7

Q. Yes.

8

A. Yes, that was the consensus.

9

Q. Well, where would you personally  
rate this now in the scale of 1 to 10?

10

11

A. I might put a little more  
emphasis on this and bring it up into the, oh, 3 or 4  
possibility.

12

13

Q. Doctor, could you look at your  
code number, I think it is 13.

14

15

A. Yes.

16

Q. Matthew Lutes.

17

A. Pardon me?

18

MR. LABOW: Page 77, Mr. Commissioner.

19

THE WITNESS: Who is that?

20

MR. LABOW: Q. I think it is No. 13,  
Lutes, Matthew Lutes.

21

A. Go ahead.

22

Q. Now, I can tell you that Dr. Rowe

23

told us in evidence in Volume 14, page 2437, that the  
digoxin in this case was held because it was held at

24

25





BB.4

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

one point, because although the level was only about 2.1 it might have been too high for this child. I would like you to turn to Dr. Moller's note, Exhibit 314 on this child, and I know you have some difficulty interpreting what this means. I would like to see if you can help me somewhat.

A. Go ahead.

Q. Now, at the very top --

THE COMMISSIONER: I am sorry, I just have to find it yet.

MR. LABOW: It should be page 9 of that.

THE COMMISSIONER: I have a beautiful index but then the pages are not numbered.

MR. LABOW: Q. Dr. Moller seemd to write:

"Q brady and dig. level."

The Q means question?

A. Yes. I think that is what I told you, or suggested that meant, bradycardia probably, but we can find out easily enough.

THE COMMISSIONER: I am sorry, you say he said Question?

THE WITNESS: The "Q" on top of the page.

THE COMMISSIONER: Oh, I see that is Question, yes.

THE WITNESS: I am going to submit this







BB.5

1

2

to you next week and re-clarify that, but go ahead  
and assume that is what it is.

3

4

MR. LABOW: Q At the very bottom of  
the page --

5

6

THE COMMISSIONER: When you say --

7

8

MR. LAMEK: What Dr. Mirkin means he  
suggested that he have the Moller material retyped  
and corrected just for the spelling and so on and send  
it to us in a more readily comprehensible form.

9

10

THE COMMISSIONER: Yes, all right, thank  
you.

11

12

MR. LABOW: Q Now the very bottom line  
above 1 EKG: "Held dig. although 2.2 toxic".

13

14

A. Yes.

15

16

Q This would seem to me to be the  
same view as Dr. Rowe had, that 2.2 was probably too  
high for this child?

17

18

19

20

21

22

23

24

25

A. Well, I think that you have to  
understand that this statement is probably an obser-  
vation that was made in the chart, that that is not  
Dr. Moller's conclusion from the observations made,  
okay. I am sure that somehow if we look through the  
zebra chart of this patient we will find this wording  
in there, that probably reflects that, whoever made  
that observation, Dr. Rowe or an associate, that would





BB.6

1

2

be my interpretation of that comment.

3

4

5

6

You see if Dr. Moller had felt we had a strong case here for intoxication he would have voted that and it would have showed up in these scores. I think this particular patient had a low score also.

7

Q. 2.2.

8

9

10

11

A. Well, since it was a very narrow range of variation, you know, of these I think that really reflects our collective thinking on the subject, at least to the best of our ability to interpret the data.

12

13

14

Q. Do you recall whether Dr. Moller was strongly, or not strongly one way or the other indicating what he thought the data meant?

15

16

17

18

19

20

A. Well I think it is a little difficult for me to recall that particular point. I certainly will be able to get his information for you if you like and it will be helpful to the Commission, it will be very easy for me to get and I will be delighted to do it. So I give you as accurate a portrayal of his interpretation of this as is possible.

21

Q. Okay.

22

A. I will do that then.

23

24

25

Q. Thank you. Now, my only other

question concerning Real Gosselin, and this is page 49





BB.7

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

of Exhibit 313, and it is your Code No. 29. Now,  
once more in No. 8, the final note with the asterisk  
says:

"Suddenness of change in clinical  
condition supports intoxication  
particularly in absence of any  
significant alteration ... ",  
is that correct?

A. That is correct.

Q. " ... in pathophysiological  
process."

What kind of alteration were you  
thinking about that may have changed your opinion?

A. I guess one thing here that  
always caused some problem for me and it did through-  
out this evaluation was isolating events that could  
have been going on concurrently with the high or even  
low digoxin concentration in these particular patients.  
I was essentially, if you will note on the first  
page of this individual under Item III B, significant  
events at 12.17 p.m. you will see "respiratory  
arrest, electrolytes normal."

One of the things that we were trying  
to correlate were some of these plasma concentrations  
with the electrolyte status of the individual.







BB.8

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Particularly in a patient like this where we had concentrations of - this one I think we had 3.9, we were, I was interested in the evaluation at least in attempting to determine whether this patient had low potassium which might have accentuated the effect of that particular concentration.

We also had a patient here who had seemed to be manifesting a good response to some treatment up to the time of death, although I see that this patient was not responsive to the prostaglandin, but had been responsive to the Lasix given to the subject. So by that I meant there had been no general change in the status of this particular patient.

Another possibility that I was concerned about was the well known effect of oxygen deprivation on digitalis intoxication. Now the fact this patient had apnea the day before in its hypoxic state this may have enhanced the state of the digoxin as well. So those would have been the general types of changes, the pathophysiologic changes we look for.

Q What is the effect of oxygen deprivation on digitalis intoxication?

A Well, I think probably most people would feel that tissue that is deprived of oxygen probably shows increasing sensitivity to these drugs.





BB. 9

1

2

3

MR. LABOW: Thank you very much, I  
have no further questions, Mr. Commissioner.

4

THE COMMISSIONER: Thank you.

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25





1

2

THE COMMISSIONER: Thank you.

3

Mr. Shanahan.

4

CROSS-EXAMINATION BY MR. SHANAHAN:

5

Q. Good afternoon, Doctor, my

6

name is Shanahan and I act for the parents of two  
of the children, the Lombardo and Dawson children.

7

Now, mind you, after hearing the evidence that you have

8

given with respect to Lombardo and the explanations

9

you have given of your numbering system I really don't

10

have any questions on the Lombardo child.

11

But I am a little concerned about

12

your arrival at a rating for Baby Dawson from an

13

observation of her clinical symptoms in arriving

14

at a rating, I believe it was zero.

15

Now, looking at that exhibit first

16

of all here, Exhibit 313, on the conclusion I am

17

looking at, as it is numbered here, page 24. Do

18

you have that, Doctor? One of the things that struck

19

me first of all where it says in the last paragraph

here:

20

"Digitalis intoxications: Present,

21

Absent."

22

First of all, it doesn't seem to be a wholehearted

23

conclusion here by saying probably absent. Then

24

in reading the last comments here, in line 4 it

25







1  
2 acknowledges that the cause of death is unclear.

3 Do you have that located, Doctor?

4 A. Yes.

5 Q. And then there is a part  
6 stroked out and concludes: "No clear evidence of  
7 digoxin intoxication."

8 It struck me, Doctor O'Dea I think  
9 is the individual who was looking at this particular  
10 set of charts and it struck me just right there that  
11 there certainly didn't appear to be, in his mind,  
12 a categorical rejection of the possibility of  
13 digitalis intoxication. He says here there is no  
14 clear evidence. Does that suggest to you or did it  
15 suggest in your discussions that maybe there was some  
16 indication clinically that this child may have suf-  
17 fered from digoxin intoxication?

18 A. Well, we didn't reach that  
19 conclusion, as you see. The information that we had  
20 on this particular patient consisted of again a  
21 plasma level that was consistent with the normal  
22 therapeutic range. We had very little evidence of  
23 any arrhythmias, we had no evidence of even some  
24 softer signs of digitalis intoxication and I think  
25 that was the basis for the judgment. I guess had we  
had more information it might have been possible to





1  
2 come up with a clearer -- it is not an ambiguous  
3 statement. To say "probably", I guess I probably  
4 would have eliminated probably and said absent.

5 Q. All right. I am not going  
6 to belabor the issue here, but if I could just show  
7 you or take you through just a few pages here of  
8 Dawson's medical chart, the chart that presumably Dr.  
9 O'Dea would have looked at, Exhibit 69, because they  
10 troubled me and if I could ask you to direct your  
attention to them when you have them.

11 A. Sure.

12 Q. In that volume you have, sir,  
13 if you could turn to page 85. Now, when I was reading  
14 the last few days I bear in mind, sir, that this child  
15 died on July, I believe it was 27th or early 28th, and  
16 the last reading I believe that you had, a serum  
17 reading was 1.9 on the 24th, that would be three  
days earlier.

18 Now, that indeed perhaps and the  
19 levels we have been given wouldn't cause great  
20 concern but then the days following, as I looked at  
21 the nurse's notes, it struck me that some of the  
22 symptoms of others in your profession have said  
23 would be symptoms of digoxin overdose seem to me  
24 to be coming into the records of Amber Dawson.  
25







1  
2 Now, page 85 of those records, if  
3 you could turn to it, that is the note there on the  
4 top of page 85 of July 25th and under Behavior there  
5 it says:

6 "Appeared drowsy, slept continuously  
7 between feeds."

8 And then at the bottom again in nurse's handwriting  
9 on July 26th under Behavior it says:

10 "Very lethargic all evening -- limbs  
11 appear almost floppy at times."

12 And then turning back to page 80, although we are  
13 turning back we are really going forward in time.  
14 On page 80 of those records, July 27th prepared by  
15 Nurse Nelles it says under Behavior, around the  
16 middle of the page, Doctor "Continues to be lethargic".  
17 Under Nutrition "Dr. Reynolds notified re. babe's  
18 poor nutritional status and lethargy."

19 The terminal notes written up by  
20 Dr. Reynolds, I think they are Reynolds, at least on  
21 page 84, they speak there, sir, the heavy dark writing  
22 there, line 3 of that heavy dark writing speaks of  
23 a sudden recent deterioration and collapse and coming  
24 down a few lines extreme bradycardia in spite of  
25 heroic efforts there, there is just no return, the  
last three lines here, of any electrical activity at all.







1  
2 Now, as I look at that, sir, it  
3 would suggest to me possibly, bearing in mind that  
4 vomiting is maybe a nonspecific symptom, but still,  
5 that in fact you may well have there a symptom of,  
6 in the last few days without a serum reading, you may  
7 well have a symptom of digoxin intoxication.

8 A. I would have a lot of trouble  
9 buying that one.

10 Q. All right.

11 A. The main point I think you  
12 are raising, and correct me if I have missed it,  
13 within the behavioral observations the patient being  
14 drowsy, the suggestion that there is some loss of  
15 muscle tone, the floppiness.

16 Q. Yes.

17 A. We don't see too much here  
18 on emesis occurring, I didn't see any, as a matter  
19 of fact. You know, the slowing of the heart rate  
20 and the terminal event, you know, a lot of this could  
21 have just come about from impairment of the respiratory  
22 system and I think we had the patient that was  
23 showing some respiratory distress. Now, whether one  
24 wants to attribute this to drug intoxication one could  
25 make that proposal but I have difficulty because we  
don't seem to see any reported irregularities in the





1  
2 rhythm.

3 If you will notice on page 80,  
4 July 27th, now, this is right before the arrest, the  
5 patient's apex is being described as 130 to 106 and  
6 regular. Admittedly, you know, I think a cardiologist  
7 might argue, and correctly so, that the apex beat is  
8 not a good way to discern irregularities. Now, ob-  
9 viously if we had electrocardiographic tracings  
10 at that time, and I must confess I don't know where  
they are.

11 Q. No.

12 A. Or if they were taken. I  
13 shouldn't infer that they were taken and not made  
14 available but that might have helped us and I think  
helped you.

15 Q. But in terms of giving you  
16 an overall picture, bearing in mind that this child  
17 here, and it is noted in your other records there,  
18 her age, eleven months, that she had already had  
19 successful surgery, a banding, that she had returned  
20 to the hospital not because of any precipitating  
21 event, it was just nutritionally she was poor, her  
22 weight was down, she was back in to have her overall  
23 condition reassessed. On the horizon there was talk  
of surgery to assist her with respect to the phrenic





1  
2 nerve paralysis, but certainly nothing urgent was  
3 scheduled. But within five days there would be this,  
4 especially in the last three days after that last  
5 reading, there would be this real deterioration sud-  
6 den enough and unexpected enough that somebody would,  
7 as you can see from the records, notify the coroner  
and have an autopsy done.

8 Now, surely that would be part of  
9 the clinical picture that you would sort of be aware  
10 of and appreciate as you would sort of sum up whether  
11 in fact there was something dubious about the symptoms  
12 she was exhibiting.

13 A. Well, we couldn't really  
14 discern I think whether this patient might have fit  
15 into the unexpected category, which is something you  
are implying.

16 Q. Yes.

17 A. And, you know, it is important  
18 to recognize that this patient did have pneumonia on  
19 January 23rd.

20 Q. On what date, I'm sorry?

21 A. This patient on January--  
22 I'm sorry, July 23rd, 1980. The notation is made,  
23 bilateral patchy consolidation of the lungs. In  
24 layman terms that is pneumonia.  
25







1

2

Q. Yes.

3

A. And that is an X-ray

4

description which would suggest that some fluid or  
infectious process was in the lungs. That doesn't

5

surprise me. You see, you have a patient here in whom

6

the large blood vessel bringing blood to the lungs

7

has been banded. This patient also in 1980, that

8

band was taken off in May.

9

Q. That's right.

10

A. The patient may have been,

11

you know, the patient is described as a cyanotic

12

malnourished little baby. Now, that is not a healthy

13

child. Now, nor would I want to imply from that

14

statement that one would expect a death in four days  
after admission.

15

Q. She has lived at home after

16

all with her mother and received a dosage and

17

been cared for by mother. So, I am sure you will

18

bear that in mind.

19

A. Oh, surely. Now, I think

20

that is an important point and I don't want to infer

21

that this is a sick child, but not necessarily one

22

that is going to die right away in four or five days  
in the hospital.

23

Q. All right.

24

25





1

2

A. Okay.

3

Q. Now, would you have had -- I'm

4

sorry, have you finished, maybe you haven't.

5

A. No, that's all right.

6

Q. All right Would you have

7

had the autopsy report available? Perhaps that is something that someone else has asked you.

8

A. I think we did.

9

Q. All right.

10

A. No, I am sure we did, we had

11

all the charts, I had this chart and we went through

12

it, or my colleague did and we have here in the autopsy

13

report gastric perforation, hemoperitoneum, you had

14

blood in the peritoneum cavity, you had some de-

15

generation of the central nervous system and there

16

was closure of the septal defects. But you had a

17

patient who was in a very poor nutritional state. I

18

don't think we should infer it is a healthy child and

19

I don't want to overdo that, but the question comes

20

up would these findings have been attributable to the

21

patient's primary disease. I would submit to you that

22

the pneumonia is consistent with this patient's disease.

23

Q. All right. Can I just show

24

you then to get into the autopsy report briefly here

25





1  
2 and then that will conclude my examination here.  
3 It is in that large volume you have there.

4 A. Can you give me the number,  
5 please?

6 Q. It commences on page 59.  
7 The area first of all, page 63 about the microscopic  
8 and laboratory findings here from the laboratory. The  
9 lungs, it says:

10 "The sections show areas of collapse  
11 and overdistension. There is also  
12 congestion of pulmonary vessels.  
13 No evidence of recent or old pneu-  
14 monitis is seen."

15 Now, does that fly in the face of  
16 what you just said about pneumonia?

17 A. No. I would take the lab  
18 data and it would suggest that the X-ray, the  
19 interpretation of the X-ray would have been suspect.  
20 You know, that is odd. Is this the microscopic  
21 findings?

22 Q. That's right. It would seem  
23 to me as a layman that it is saying that it wasn't  
24 pneumonia.

25 A. I think it would say to me  
as a physician that there is no pneumonia there, I







1

2

accept that.

3

4

5

6

7

8

9

10

11

Q. All right. Let's put that  
aside for a moment. Page 61, it does confirm here  
about the recent perforation of the stomach. Dr.  
Rowe felt that in trying to get to the bottom of why  
this child and how it died, the cause of death,  
he felt that maybe as sick as she was and as weak  
as she was and what have you that this perforation  
could have perhaps triggered that final deteriora-  
tion.

12

13

14

15

16

17

18

19

20

21

22

23

24

25

A. Yes.

Q. Now, I point out to you here  
that if the vomiting that I have suggested to you,  
the persistent vomiting over that last three or four  
days in fact has caused this perforation, has been  
so violent and so persistent as to cause that  
perforation, again, I return to the proposition could  
that be vomiting of a nature that was induced or  
caused by perhaps digoxin toxicity?

A. I didn't say the vomiting -  
I didn't ---

Q. This was what I pointed out  
to you earlier that we had looked at and you felt  
you didn't read as much into it as I did.

A. I didn't see it, what page





1

2

was that on?

3

Q. Page 80, page 85.

4

A. Yes.

5

Q. The floppiness, the lethargy

6

and prior to that the vomiting.

7

A. Could you show me where the

8

emesis is described, do you mind?

9

Q. I will try.

10

A. What page is it?

11

Q. There is one reference here

on page 79.

12

A. Okay, on page 79, I see it.

13

Q. 79, but that says just once.

14

A. Yes.

15

Q. When the nurse forced some

16

milk and I don't know if forcing milk in itself may  
well have --

17

A. No.

18

Q. Page 86 here, again, the

19

reference around 10 lines from the top there where

20

the writing style changes, a reference to the lethargy

21

during the course of the day, "Not interested in

22

feeds and vomited twice."

23

A. Yes, okay.

24

25





12jan84  
DD  
DPrc

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

Q. Indeed, I had others, sir.

I regret that I did not show you more.

A. That is fine. That is okay.

Q. Again, as a layman here, I am trying persistent vomiting with perhaps perforation in the stomach lining because there does not seem to be any other reason why her stomach lining would be perforated.

A. Do you think the inference is that the emesis caused the perforation?

Q. I am asking, could that have happened?

A. I don't find that terribly likely.

Q. You don't find it likely?

A. No. I think perhaps other factors might. Stress ulcer, in this patient, would be, to me, a more likely possibility.

Q. Stress ulcer?

A. Yes.

THE COMMISSIONER: Is that shown in the autopsy?

THE WITNESS: I think they just describe -- they show an area of recent perforation, hemorrhage and some adhesions.

THE COMMISSIONER: Would not the







DD2 2 ulcer be apparent on the autopsy?

3 THE WITNESS: It depends. I think  
4 it would have been. They just show the perforation.

5 The point I am making is that I  
6 think it is well known that infants who are in  
7 stress can develop ulcers - ulceration - and whether  
8 that was also the basis for the perforation, I raise  
that possibility.

9 I am not aware, I should put it,  
10 that persistent vomiting induced by this would be  
11 a likely cause of perforation.

12 THE COMMISSIONER: What about this  
13 then? Looking at page 63, under Item 7:

14 "Gastromalacia with perforation of  
15 the cardia was a recent event most  
likely precipitated by vomiting."

16 What does that mean?

17 THE WITNESS: That is what this  
18 gentleman is inferring.

19 THE COMMISSIONER: Yes. Do you  
20 think -- I always thought that an ulcer, if it  
21 existed, would have been apparent on autopsy and  
would have been included.

22 THE WITNESS: I think the ulcer  
23 crater would have been apparent on autopsy but, if  
24  
25





DD3

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

the perforation occurred at the site of the ulceration, it might have been obliterated.

Again, this is very speculative, what I am doing, and I am unable, I think, to provide a further stronger relationship between the symptoms you are describing and the likelihood of digitalis intoxication in this particular patient.

MR. LABOW: All right.

Q. One final thing --

THE COMMISSIONER: If I could just interrupt for a moment.

The perforation itself, how serious is that? Can that cause death in itself, perforation of the stomach?

THE WITNESS: Oh, yes, put the patient into shock.

THE COMMISSIONER: Have you any opinion on this one, whether the perforation was a major cause of death?

THE WITNESS: I don't have any data. It is not in the chart, at least in the summary of the chart, but if the patient, on the day preceding death, or the 26th of July, was showing signs of shock, I think that would have been consistent with the perforation having occurred at that time.







DD4

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

On the 26th of July, this patient was showing reduced heart rate and respiratory distress, possibly symptoms that could be associated with a shock-like state, which could be induced by a perforated ulcer definitely.

I think that is not impossible or maybe even --

THE COMMISSIONER: If you said a perforated ulcer, I understand that, but a perforated ulcer does not necessarily produce a perforated stomach. If the ulcer is in the stomach and perforates, it could cause all sorts of damage to the stomach but it does not necessarily perforate the stomach, does it?

THE WITNESS: No, it does not. But if it does -- if the lining --

THE COMMISSIONER: The thing that concerns me is that the autopsy seems to say that the perforation was most likely precipitated by vomiting, and you are suggesting that the perforation was most likely precipitated by a perforated ulcer.

THE WITNESS: The word "gastromalacia", it refers to the thinning of the gastric wall. What is the cause of that? Usually, when we talk about ulceration, we are thinning the wall or decreasing the







DD5

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

width of the wall so that it becomes more vulnerable to bursting, to frank perforation.

When you have frank perforation, you have bleeding and you could have the sequela that was observed here. But I think that I can't confirm, based on this pathological report, that that occurred.

On the other hand, the blocks from the Pathology Department will have all these tissues; they don't throw those out. If you think it is worth looking it, you can have them cut some more sections and take another look at it.

MR. LABOW: Q. One final area here is that, in that paragraph 7 where it does summarize the abnormal findings, you see where it says:

"The autopsy showed the surgical repair of congenital heart defects has been successful. Ventricular and septal heart defects have been closed and appear intact."

Under paragraph 8, where there was a place to comment on the cause of death:

"The immediate anatomical cause of death not determined."

Specifically commenting on the





DD6

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

operations on the following page - and I won't read all of it, but where it specifically breaks down under paragraph 9, the heart, under "final impression", under sentence No. 1 and No. 3, it indicates that the techniques and the surgery that were used to close the septal defects were all completed and the comment on both of them, I think, says, "with excellent surgical result."

To me, as a layman again, it would appear that Amber Dawson had gone in, had been properly assessed, had been properly treated, the techniques had been done properly. This has been confirmed in an autopsy that you would be able to look at. It was confirmed in autopsy as well that there was no pneumonia and confirmed in autopsy that there had been perforation of the stomach lining, which was recent and precipitated by vomiting.

Again, I guess I am just harping at the same thing, would that not then be suggestive, and this pathologist not being able to come to a cause of death, suggestive of perhaps digoxin intoxication?

A. I think the most we could go here -- I don't think that would be suggestive of digoxin intoxication at all, in my mind. I would, I think, agree with you that, on review here and as





DD7

1

2

we indicated in this document, the cause of death  
is unclear.

3

4

Q. Yes.

5

6

7

8

9

A. I think maybe that category --  
this patient could be included in our uncertain cause  
of death group, perhaps, and probably, I think, would.  
But I really cannot put this together in sufficient  
clarity or commitment to say with any degree of  
assurance that this was digitalis intoxication.

10

11

In light of that, I would rather  
not. I think that is the fairest way to assess it.

12

13

14

Q. You would rather leave it  
that her cause of death is just uncertain and put  
her in that uncertain category?

15

A. I think that is about all I  
can do.

16

17

18

19

MR. SHANAHAN: Thank you, doctor.

THE WITNESS: Thank you.

THE COMMISSIONER: Thank you, Mr.  
Shanahan.

20

Mr. Lamek, what would you like?  
Would you like a break?

21

22

MR. LAMEK: Perhaps just a short  
break, if we could, Mr. Commissioner.

23

24

25

THE COMMISSIONER: It can be as long







DD8

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

as you like. We don't have to take a short one.

People may want coffee. If we take fifteen minutes,  
is there any remote possibility that we will not  
finish?

MR. LAMEK: Not the slightest.

THE COMMISSIONER: Let us take  
fifteen minutes then.

--- recess.





1 --- on resuming.

2 THE COMMISSIONER: Yes, Mr. Lamek.

3 REDIRECT EXAMINATION BY MR. LAMEK:

4 Q. Dr. Mirkin, while we are  
5 dealing with the question of Dawson, the child that  
6 you were last discussing with Mr. Shanahan, do you  
7 still have the chart available to you, please?

8 A. Yes, I do.

9 Q. I would like to ask you just  
10 a couple of more questions about the stomach perfora-  
11 tion. Could you turn to page 63, please, in the  
12 autopsy report. You have postulated the possibility  
13 of an ulcer which may have been at the site of the  
14 rupture that was found at autopsy. At the top of  
15 page 63 we see there are microscopic and laboratory  
16 findings briefly summarized. The third item relates  
17 to "stomach" and reports:

18 "Sections through the area of  
19 perforation shows hyalinization  
20 and thinning of muscular coat. In  
21 areas adjacent to the rupture, the  
22 blood vessels are distended and there  
23 is interstitial hemorrhage."

24 Are those reported findings of any  
25 significance with respect to your postulation of  
the possibility of an ulcer?





1  
2 A. The hyalinization and  
3 thinning of muscular coat suggests that there may have  
4 been some long standing effect on that region of the  
5 stomach that ante-dates that perforation.

6 Q. What is hyalinization, please?

7 A. I am trying to give the most  
8 accurate definition. I believe we refer here to the  
9 change in the structure of the normal lining of the  
10 stomach to one that consists of connective tissue,  
11 fibrous tissue instead of the normal mucocoele  
12 cells that lie in the stomach, and the hyalinization  
13 to me would infer change in the composition of these  
14 cells so that they had a consistency that was rather  
15 uniform. Hyalinization, the term hyalinization I  
16 believe refers to the staining characteristics of the  
17 cell.

18 Q. The staining characteristics?

19 A. The staining characteristics  
20 of the cell, of the connective tissue. It is  
21 clear as I stumble around for a good description that  
22 I am unable to give one that is going to be  
23 pathologically precise. I perhaps should not attempt  
24 to and look it up before I do that.

25 Q. Doctor, do those reported  
findings as you understand them lend any support to







1  
2 or are they consistent with your hypothesis of ulcer?

3 A. Well, I think that it might  
4 go along with it. If one suggested that an area  
5 of the stomach was indeed undergoing change prior to  
6 these periods of emesis.

7 Q. Yes.

8 A. Then I would postulate that  
9 this particular location might have undergone sufficient  
10 thinning to perforate.

11 One of the points to be raised here  
12 is whether or not blood had been shown on the gastric  
13 aspirate of this patient. Obviously if a patient  
14 is having a gastric ulcer of any consequence they may  
15 pass some blood in the stool, or it might be found  
16 in the aspirate from the patient's stomach.

17 I don't know if any record of that  
18 exists in the chart, and one could use the absence  
19 of that information as a negative vote against that  
20 hypothesis.

21 Q. In the light of that, perhaps  
22 more significantly in light of the fact that there does  
23 not appear to be any clear evidence as I understand  
24 you in support of the hypothesis of perforated  
25 ulcer, is there any other explanation, other than  
the one which Mr. Shanahan suggested to you, as to





1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

the way in which this perforation of the stomach may have occurred, that is other than as a result of the emesis; the heaving, I take it this child experienced.

A. Well, certainly perforated ulcers or stomachs occur as a consequence of having a tube down. One could visualize a tube being passed and the perforation does occur by that route. I don't know if this child had a forceful feeding tube or anything of that sort described in the record.

Q. In any event it is clear, is it not, from the same page 63 that Dr. Cutz, the pathologist at the hospital who performed this autopsy for the coroner, he does not appear to have considered the stomach perforation as a contributing element in the death of the child.

A. That is what one would conclude.

Q. Therefore perforation of the stomach notwithstanding the cause of Amber Dawson's death still remains something of a mystery.

A. Yes, I think it does.

Q. If I may, Dr. Mirkin, briefly, just a very few questions arising out of





1  
2 matters covered in one or the other of the cross-  
3 examinations.

4 Mr. Brown yesterday referred you  
5 to the results of what we call the gutter blood  
6 study in the context of a discussion of Janice  
7 Estrella and that child's death. In particular, he  
8 showed you the particular results of that study, and  
9 I think you will agree with me that although you  
10 have not seen the particular results, the substance  
11 of the results had been outlined to you prior to  
12 your giving evidence.

13 As I understood you, you said that  
14 the reasonably good correlation between all but one  
15 of the results reported in gutter samples and levels  
16 reported in heart blood from the same children  
17 enabled you to have a reasonably good confidence  
18 level in the 72 nanogram level reported in Estrella,  
19 notwithstanding that there was one extremely high  
20 and anomalous gutter level in the study. That is a  
21 rather tortuous way of summarizing your evidence,  
22 but do I put it fairly?

23 A. Perfectly accurate.

24 Q. In short, the existence of  
25 the one anomalously high reading of the gutter  
blood study does not greatly shake the confidence







1  
2 that you are prepared to place in the post mortem  
3 Estrella sample.

4 A. Correct.

5 Q. And as I therefore understood  
6 it you are prepared to revise again, or re-revise  
7 your opinion as to the probable involvement of  
8 digoxin in the death of Janice Estrella.

9 A. Based on this post mortem  
10 information.

11 Q. And do I understand that you  
12 are now inclined to think that digoxin intoxication  
13 did indeed play a part, if it was not indeed the cause  
14 of Janice Estrella's death?

15 A. I think that is correct.

16 Q. Now, Doctor, I am obliged  
17 to tell you that others who have preceded you in the  
18 witness box here, that is to say in particular Doctors  
19 Kauffman and Hastreiter, have said, having reviewed  
20 the same data from the gutter blood study, that although  
21 they would not completely discard the Estrella sample,  
22 their level of confidence in that sample has to be  
23 reduced very considerably, and indeed Dr. Kauffman  
24 as I recall it reduced the child from a 5 to a  
25 2 or something of that sort, and 5 was the top of  
his range and 2 was barely suspicious, and Hastreiter





1  
2 made a similar adjustment in his assessment of the  
3 likelihood of digoxin involvement.

4 I am interested of course in the  
5 very different attitudes which you have taken to the  
6 gutter blood study numbers. Can you tell me how it  
7 is you feel able to virtually discard the enormously  
8 high number in the gutter blood study and maintain  
9 your confidence in the Estrella number?

10 A. The decision I made in that  
11 regard is based on the following reasoning. We had,  
12 as I recall, 13 patients analyzed.

13 MR. YOUNG: Fourteen.

14 THE WITNESS: Fourteen patients  
15 analyzed in whom heart blood was obtained, cardiac  
16 puncture blood and blood levels determined. We had  
17 14 so-called gutter lodeterminations, and the  
18 relationship between 13 of the 14, that is the ratio  
19 of gutter 1 to cardiac blood was in a relatively  
20 constant relationship with the exception of that  
21 one analysis. We had further gutter 2 blood  
22 obtained in which the relationship between the gutter  
23 2 blood and the gutter 1 blood was, the correlation  
24 was very high, in addition to which by virtue of that  
25 fact, with the exception of that one sample, the  
correlation between gutter 2 blood and cardiac blood  
was also quite constant.



BmB.jc  
FF1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

That means, as I analyze the data,  
27 out of 28 determinations were on line.

Q. I don't think there were quite  
28.

THE COMMISSIONER: No, I think it was  
26 out of 28.

THE WITNESS: 26.

THE COMMISSIONER: No, 25 out of the 28  
because two of them ---

THE COMMISSIONER: Perhaps we should  
look at the actual results.

THE WITNESS: Okay.

MR. LAMEK: Q. So that we are not  
having to rely on memory. I think it was 238.

THE COMMISSIONER: I think two of them,  
that's my recollection, that two of them they didn't  
test in Gutter 2.

THE WITNESS: Okay. Well, I don't  
think that I will modify my answer.

THE COMMISSIONER: It doesn't make  
any difference.

THE WITNESS: Not to me.

THE COMMISSIONER: No, I am getting -  
I guess it is only Thursday afternoon and I am  
getting picky about these things, but you are quite  
right.







A.

FF.2

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

MR. LAMEK: We are talking about Exhibit 238, Dr. Mirkin. Just so that we are absolutely confident in the numbers about which you're talking about.

THE WITNESS: That is correct.

MR. LAMEK: Q. Yes.

A. Now, there are two pieces of information. Do you all have copies of this, you are all familiar with it, I presume? If one were to do a statistical analysis of these data it is clear in my mind without even doing it right here publicly that we would come up with a highly significant relationship, I would say in the order of probability of 1, less than one in a thousand that  $P = .001$  maybe would even be  $P = 0.001$ .

Q. I am sorry, you will have to explain that to me.

A. Now, what I am saying ---

Q. The relationship between what and what?

A. The relationship between the concentration of drug in the heart blood.

Q. Yes.

A. And the concentration of blood in the gutter.





FF.3

1

2

Q Yes.

3

A Now, that one abnormality, that

4

one spurious observation, I will use that term, I

5

know that is not legally appropriate but I say it

6

from my statistical analysis or viewpoint or from

7

that of an investigator carrying out an experiment

8

when confronted with these data I can't understand

9

frankly how any of the consultants without subjecting

10

this even to the most casual statistical analysis

11

were able to reject these data out of hand.

12

These data to me strongly indicate that

13

when the blood is obtained from an individual even

14

after two or three hours following the post mortem,

15

that is in the Gutter 2 samples, there is a very

16

strong correlation between that sample and the post

17

mortem cardiac blood sample. Therefore, I feel it

18

is very easy to place confidence in this Estrella

19

sample, assuming of course that it was obtained in

20

the same or similar manner as the Gutter 2 blood in

21

this study.

22

Q Goodness knows I am no

23

statistician, Dr. Mirkin, but I understand you to be

24

saying that notwithstanding an incidence of once in,

25

what is it, 25 samples here, there was the anomaly

statistically the chances of that anomaly occurring





FF.4

1

2

are far less than 1 in 25. Is that what you're suggesting?

3

4

A. Yes. Well, you see, I am saying that the probability - yes, okay, I am saying that.

5

6

Q. Okay.

7

A. Okay, that is correct.

8

9

Q. And are you also saying that statistically the chances of such anomalies occurring are sufficiently small that your ability to rely upon the correlation which exists in the other data is not shaken. Your ability to rely upon the correlation that is shown in the other data and therefore to treat as reliable the Estrella sample is not seriously shaken by the anomaly?

10

11

12

13

14

A. You know, I don't understand what you mean by the other data, that is what I am missing.

15

16

17

Q. I am talking about the other 23 or 24 cases.

18

19

A. Oh, yes.

20

Q. Where you have told me there is a good correlation between gutter blood and heart blood.

21

22

A. Yes, that is correct then.

23

24

Q. And the statistical probability

25







FF.5

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

of the anomaly occurring is sufficiently small that it is your opinion you can rely with confidence upon gutter blood concentrations?

A. Yes, on the presumption that this is a valid experiment and replicates the patient's sampling procedure.

Q. A question if I may please about the Woodcock child. It had seemed to me that when you were giving your evidence both in chief and in a very large part in cross-examination you stressed repeatedly with respect to Woodcock that it was an important element in your assessment that that child very likely had digoxin involvement in her death, that digoxin had not been prescribed for her. Do you recall saying that on a number of occasions over the last couple of days?

A. Yes.

Q. It has been pointed out to you today that at the referring hospital, at the Oshawa General Hospital, she had indeed received digoxin. Indeed, the amount she received is set out in the chart if you need to look at them. Clearly she had not received digoxin in the last four days of her life which she spent at The Hospital for Sick Children. Does the fact that the child had received digoxin at





FF.6

1

2

3

4

5

6

7

8

9

10

11

(2)

12

13

14

15

16

17

18

19

20

21

22

23

24

25

any stage of her life, that is to say at the referring hospital, affect in any way the opinion that you have expressed as to the likelihood or the possibility of digoxin involvement in her death?

A. No, I think we would come up with the same conclusions.

Q. All right. Do I take it therefore that you were focussing upon the last days of her life as disclosed in The Hospital for Sick Children treatment record?

A. That is correct.

Q. All right. May I move to the extremely high serum concentration that was recorded in the sample of what is to be believed serum from the Inwood baby.

In cross-examination this morning my friend Ms. McIntyre was asking you about the effects upon that sample and therefore upon the concentration measured in it of its rather dubious history. In particular, she was asking you about the possibility of evaporation of the sample in a refrigerator and you conceded I think it was possible there could have been some evaporation. Now, Doctor, you have told us that the serum sample of 491 nanograms per millilitre which was pointed out to you in the





FF.7

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

course of your evidence, you regard as a very important piece of evidence in coming to the conclusion that you have expressed about this child.

Ms. McIntyre suggested to you that if perhaps the volume of the sample had been reduced by 50 per cent as a result of evaporation that I take it would have led to a false concentration by a factor of 2 in the sample that remained?

A. Correct.

Q. Would you have regarded the evidence as any less significant if the true concentration had been 250 nanograms per millilitre?

A. Still in the toxic range and one of very high risk to the patient.

Q. Or indeed if 75 per cent of the sample had disappeared and the true concentration in the entire sample had been 125 nanograms per millilitre, would you still have regarded it as important evidence upon which to base the same conclusion you have expressed?

A. Yes.

Q. Thank you. Just one other matter if I may, Doctor, for my understanding.

My friend Mr. Olah was talking to you about the death of the child Pacsai and he was







FF.8

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

asking you to estimate if you could the earliest possible time at which an overdose of digoxin might have been administered to that child so as to produce the first signs of digoxin toxicity which you and he discussed from the chart. He was talking to you in the context of one adult vial of digoxin as being the presumed size of the dose. He asked you whether, if the dose were indeed a multiple vial dose, by which he meant two or more vials, would one expect to see an earlier onset of symptoms. Your answer to him, as I recall it, was, yes, the larger the dose the sooner you might reasonably expect to see symptoms. My question is this, Dr. Mirkin. If you are talking in terms of a presumed dose of one adult vial I take it that is already a very substantial overdose for an infant?

A. Yes, if the entire vial is given, correct. We are talking about 500 micrograms, is that correct?

Q. Yes.

A. I think it is 250, yes, cc's.

Q. Is that not a sufficiently huge overdose in the first place?

A. Yes.

Q. That an increase in that dose





FF.9

1

2

would not produce the first effects of intoxication  
at any appreciable earlier point in time?

3

4

A. That's a difficult question to  
answer but let me try.

5

6

Q. I didn't want to end on an  
easy one.

7

8

A. Can I go to the Board for a  
second and have three or four minutes?

9

10

Q. Sure.  
A. I might as well finish this with  
a flourish.

11

12

Q. Don't strangle yourself on your  
microphone now.

13

14

A. As you have probably had drawn  
before you there is a sort of a biological response  
of most organs in the body to increase in concentration  
of a given chemical or drug.

15

16

17

18

19

20

21

22

23

24

25





12jan84  
GG  
DPra

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

The response here I will put on the abscissae. This could be blood pressure. Let us say, in this case, it is contraction of the heart. Here we have a dose - or it could be the concentration of blood level in the body.

Under normal conditions, as we go from zero, let us say, to infinity, or let us give this a number - 100 - we get an increasing response. So as we increase from 0 to 5 to 10 to 20, the response increases. There is a point at which the system can no longer elicit an increased response, so-called plateau. This is a normal biological response we all have.

In response to the question just raised, if the initial quantity of drug given in the presumed manner; that is, this entire vial of adult strength digoxin is put into the patient, let us assume we have achieved this concentration. Therefore, we would have had a maximum response of 100 per cent. Okay? If we gave double that amount, we would have been on this plateau of the curve. We could not have enhanced this response further. That is one answer to your question.

Q. Yes.

A. Let us suppose that this,







GG2

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

which we are calling A, and this, which we are calling B, this amount of drug produces a level that was in here on this part of the dose response curve. Now, here we have a response which is roughly 50 per cent. This is A again. When I give B, I produce this concentration. So, therefore, I am still able to elicit a greater response from the heart.

Now, this response could be intoxication, it could be a positive response, et cetera. So that is the difficulty I have in answering the question. So I would say that if the amount given the first time had not produced the maximum capable response elicitable - is that a word - by that tissue, then to give twice the amount would have produced an increment in that reaction. So we would have had a shorter time frame for the onset of toxicity.

But your question raises the possibility - and I think the reality that giving 500 micrograms; that is, 2 cc. of the adult dose, would have been of such a magnitude as to produce a maximum toxic effect. I think that is probably not an unreasonable conclusion to reach. And I say then, in response to the question, that giving twice





1  
GG3 2 that amount might not have shortened the onset of  
3 the toxic effect.

4 Is that sufficiently clear?

5 THE COMMISSIONER: I thought it might  
6 have shortened the onset but might not have made the  
7 effect any greater.

8 MR. LAMEK: We are talking here  
9 about the onset of the initial indications of  
10 intoxication, sir.

11 THE COMMISSIONER: I see. I had  
12 forgotten that that was what the question was about.

13 MR. LAMEK: Q. I take it, Dr.  
14 Mirkin, no matter how quickly the onset comes on,  
15 it is a subsequent stage of intoxication distribution  
16 and, therefore, intoxication that is going to produce  
17 the maximum effect, whether that be death or something  
18 short of death?

19 We are looking at the onset of  
20 initial symptoms, are we not?

21 A. Most people would probably  
22 feel that the onset would be relatively fixed in  
23 its nature, and I think it is a little different from  
24 what I think I said in response to your question --  
25 no, the gentleman behind you - I am looking over  
you, excuse me.





GG4 1  
2 MS. THOMSON: It is done frequently.

3 THE WITNESS: No, no. No.

4 MR. LAMEK: I am going to leave you  
5 with that one, doctor.

6 THE WITNESS: Thank you very much.

7 MR. LAMEK: Thank you very much,  
8 doctor. You can now go back to warm, mellow  
9 Minneapolis!

10 THE COMMISSIONER: Thank you indeed,  
11 doctor.

12 That is it as far as we are concerned.

13 I want Mr. Lamek to say something  
14 about the schedule, but I will say initially that  
15 we will not be sitting tomorrow for one, and I will  
16 not be sitting on Monday. Some of you may be  
17 involved in some other place, and Mr. Lamek will  
18 decide unilaterally whether we will sit on Tuesday  
19 or not.

20 MR. LAMEK: What I suggest, Mr.  
21 Commissioner, is, if the Divisional Court matters  
22 go over at all until Tuesday, that we not sit here  
23 until Wednesday.

24 THE COMMISSIONER: All right. But  
25 suppose it just goes over for judgment or something  
like that, would you take the same position?







GG5

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

MR. LAMEK: I am inclined to think so, honestly.

THE COMMISSIONER: All right. You seem to be determined to give me a holiday on Tuesday as well.

MR. LAMEK: I am not determined; I am merely suggesting it. But, of course, if we complete the matter entirely on Monday, then we would sit here on Tuesday and I propose next week that we hear the evidence of Miss Costello, who is one of the Head Nurses on Ward 4B and, the following week, we have that Atlanta report.

THE COMMISSIONER: Has there been any decision on the question of Miss Browne?

MR. LAMEK: That was the other matter.

The statement has not at last been distributed to all counsel. I don't know whether all counsel have had an opportunity to consider whether they need to cross-examine Miss Browne on that statement. I would be very grateful to know because next week would be a good time to fit that in as well.

Perhaps I could ask all counsel to call me tomorrow if they do want to examine Miss Browne. If I have not heard by mid-afternoon, I will





GG6

1

2

assume that people do not.

3

THE COMMISSIONER: All right.

4

Is that word to the wise sufficient?

5

All right, then, sine die.

6

7

--- whereupon the hearing was adjourned at 4:15 p.m.  
sine die.

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25



1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25

THE COMMISSIONER OF THE LAND OFFICE

IN RESPONSE TO A RESOLUTION OF THE SENATE

PASSED MAY 1, 1906

RELATIVE TO THE LANDS BELONGING TO THE STATE

AND TO THE MANNER OF DISPOSAL THEREOF  
AND TO THE MANNER OF THE SALE THEREOF





